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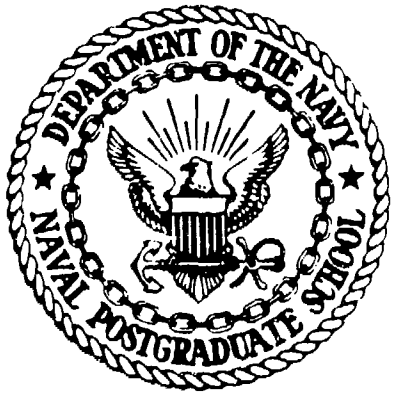

THESIS

AN EXAMINATION AND COMPARISON OF
AIRLINE AND NAVY PILOT CAREER EARNINGS

by

David A. Kriegel

March 1986

Thesis Advisor: David A. Henderson

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An Examination and Comparison of Airline and Navy Pilot Career Earnings

by

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Submitted in partial fulfillment of the
requirements for the degree of

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1. The pilot remains in the Navy, retires at age forty-two, then joins an airline, retiring at age sixty.
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My finding is that a Navy pilot will maximize his income by remaining in the military until retirement, and then flying with an airline. The present value of Navy pay exceeds airline earnings by three to six percent.

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I. INTRODUCTION

"If we are concerned with the readiness of our forces worldwide today--and we surely are--nothing is more important than to stem the exodus of our trained professionals."

Admiral Thomas B. Hayward [Ref. 1: p. 3]

The retention rates for aircraft pilots in the Navy have fluctuated widely. These trends are highly correlated to the pilot-hiring cycles of the major airlines.[1] During calendar years 1978-79 and again during 1984-85 the resignation rates of Navy pilots dramatically increased during airline hiring cycles. Dr. Samuel Kleinman, in his research on Navy pilot retention [Ref. 2], found that:

1. Pilot retention increases when commercial airline employment declines.
2. Navy pilot retention rates decline by eight to ten percent when airlines begin a moderate hiring cycle.
3. Pilot retention is responsive to the difference between military and civilian pilot pay. The retention response to pay was highest among those pilots just completing their initial service obligation.
4. The Navy loses five pilots for every three Navy pilots hired by the airlines.

Increases in pilot resignations above planned levels create problems for the Navy, manpower planners and individual pilots. The Navy's economic loss is in excess of one million dollars to train each replacement pilot.[2] Navy manpower planners assigning veteran pilots to new jobs lose flexibility. Many officers' job and location preferences can

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[1]Major airlines are defined by the Department of Labor as having gross yearly earnings of one billion dollars. Major airlines pay pilots the highest available salaries.

[2]It costs on average $1,000,000 and two years to provide basic pilot training to an officer. Additional costs are incurred to provide sufficient combat training to achieve productivity.

not be met. Pilots become less satisfied with Navy careers. More pilots decide to resign.

Why do Navy pilot resignations increase when airline hiring increases ? After all, the Navy offers exciting careers, advanced training, and world-wide travel. MONEY magazine lists the Navy as one of the top-ten organizations to work for in the United States [Ref. 3]. Pilots receive high salaries. Congress has increased pay for the military in general and for Navy pilots in particular. A series of pay raises and bonus programs authorized since 1979 places a Navy Lieutenant Commander in the top nine percent of the nation's wage earners [Ref. 4].

Resigning pilots list "excessive family separation" as their most common reason for leaving the Navy. Navy pilots spend months at sea separated from their families. Working conditions at sea are much more demanding and stressful than conditions on land. Pilots often work for weeks with little rest.[3] This stressful environment during peacetime is unique to the Navy; this may explain why Navy pilot resignation rates exceed those of the Air Force.

The more hours a person works the more valuable increasingly scarce leisure time becomes. Therefore, a worker must be paid more to be induced to work additional hours. But, in the military, pilots' salaries are based on seniority and rank, not on hours worked. As work demands increase and leisure time decreases, Navy pilots may perceive inadequate monetary rewards to balance their complaints of "excessive family separation."

Pilots leaving the Navy will seek a career which increases their leisure time without decreasing earnings. But a pilot seeking a new career will find that most jobs

---

[3]A Navy pilot is a Naval Officer first and a pilot second. A Navy unit is self-supporting. Besides flying, pilots manage maintenance, planning, and administrative groups.

pay less than the Navy. For example the average middle-level civilian manager earned $ 34,210 in 1985 or about twenty-two percent less than a thirty-year old Navy pilot [Ref. 5]. Many pilots believe an airline career offers an optimum solution. Airlines are perceived to offer increased career earnings and leisure time. Past studies conclude that pilot retention is related to the differences pilots perceive between their own military salaries and published airline salaries. A problem is that Navy pilots considering a career change have difficulty determining their true probable airline earnings. Pilots read examples of maximum airline salaries presently earned by thirty-year veteran pilots or a wage average for all pilots. Yearly average airline salaries and future earning projections are not available. Lacking average wage information, pilots can not make an informed economic decision between an airline or military career.

The airline industry is rapidly changing following its' deregulation in 1978. Today, airline wages are generally decreasing. Airline executives argue that the equilibrium for a top pilot pay could be as low as $65,000 in current dollars, 42 % below average pay for ALPA members [Ref. 6: p. 127]. Past perceptions based on maximum pay estimates are no longer valid.

Almost all Navy pilots believe that an airline career will give them higher earnings then a Navy career. However the Navy pilot's perception of high airline wages in relation to military pay is flawed. Recent increases in Navy earnings, including a $ 36,000 bonus paid to many pilots, and decreased airline salaries have changed the pay ratio. Moreover, most Navy pilots underestimate their own gross income.[4] Pilots seem to equate their net pay to gross pay.

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[4]Without exception, officers questioned by the author under-estimated their gross yearly income. Seventy-two Navy pilots under-estimated their gross earnings by $ 1,340 to

Gross Navy pay is decreased by federal, state and social security taxes. Pay is also decreased by up to $ 13,246 yearly for an officer's housing allowances (BAQ and VHA) if government housing is provided. Additionally many officers have not worked professionally in the civilian economy. They have not been exposed to civilian deductions from gross income, including union dues. The result is that officers making a career decision may actually be comparing military net pay to airline maximum gross pay.

This thesis has four objectives:

1. To determine a thirty year old pilot's expected yearly income from the major airline industry over a thirty year career.
2. To determine the gross income of the same thirty year old Navy pilot if he remains in the Navy and then joins an airline after retirement.
3. To compute retirement benefits for alternative careers one and two.
4. To compare the two lifetime income flows.

Comparisons are made using present values and assuming a discount rate of five percent. Airline retirement at age sixty is assumed. Pilots are assumed to live until age 77.6 (the average life span of a pilot). Methodologies and terms will be explained, along with discussion of assumptions and findings.

A. EXPLANATION OF PRESENT VALUE

The five percent discount rate used to compute the present value of pilot's incomes is based on people's perception of the future. Nominal interest is the common term for the amount we are paid for a borrower's use of our money. Nominal interest is composed of real interest and the expected rate of inflation. Inflation is the yearly erosion of money's purchasing power. When inflation is ten percent, $ 1.10 is required a year from now to purchase the

---

$ 14,000. The average officer underestimated income by $ 6,800.

same amount as $ 1.00 will buy today. Lenders expect nominal interest to protect the buying power of their loaned funds. They also expect a real rate of return, after inflation, for foregoing current consumption. The real rate of interest always equals the nominal rate minus the expected inflation rate, and is independent of the rate of inflation.

Nominal Interest = Real Interest + Rate of Inflation (eqn 1.1)

The discount rate of five percent used in this study is based on people's perception of the real rate of interest. Dr. Harry Gilman [Ref. 7] found that people foregoing current consumption expect to be rewarded between four and six percent. Therefore the average, five percent, is used in this study.

As inflation changes, the real interest rate remains constant causing a direct change to nominal interest. For this reason a constant five-percent may be used over a thirty year period.

The process of making pilots' wages received yearly over thirty years comparable to today's dollars is called discounting. Discounting is similar to compounding interest into the future. Today's present value of tomorrow's wage is given in equation 1.2 . A $ 50,000 pilot's wage received ten years in the future is equal to $ 30,695.66 today.[5]

Present Value of Wage Received={Wage Received/(1.00 + Real Interest Rate)}raised to future year t (eqn 1.2)

---

[5]$ 50,000 / (1.00 + .05)^{10} = $ 50,000 / 1.63 = $ 30,695.66.

When computing the present value of a series of wages each year's wage is computed separately and then summed. Wages are assumed to be paid in full at the beginning of each year. Therefore the discount 't' of the first year will be zero and it's present value will equal the wage received.

II. MILITARY COMPENSATION

A. INTRODUCTION

This chapter reviews the military compensation system, specifically those elements that determine Navy pilot pay. This review is necessary for comparing military and airline career incomes.

The present military compensation system has evolved since WWII. Compensation now consists of pays, allowances, and benefits based on a member's pay grade (rank), years-of-service (seniority), and special skills. Military compensation is paid bi-monthly as a salary, rather than based on hours worked or on individual productivity. The military compensation system is usually broken down into the following categories: (1) regular military compensation, (2) pays and allowances, and (3) other compensation elements [Ref. 8 : section one].

B. PAYS AND ALLOWANCES

Regular military compensation (RMC) is defined in U.S. Code Title 37 as the combination of basic pay, basic allowance for quarters (BAQ), basic allowance for subsistence (BAS) and the tax advantage that accrues because these two allowances are not taxable.

1. Basic Pay

Basic pay is the primary compensation received by all military personnel. Every member of the military is entitled to the continuous receipt of basic pay while on active duty. Basic pay rates are determined by an officer's pay grade and length of service in the military. For this study, basic pay was computed for Fiscal Year 1986 (Oct 1, 1985 to Sept 30, 1986). Computations were made for Navy officers in pay grades O-3 (Lieutenant), O-4 (Lieutenant

Commander), and O-5 (Commander). Length-of-service is comparable to civilian seniority. This study assumes that all officers who reach the end of their initial service obligations, where a decision to remain in the military will be made, will have eight years length of service.[6] It is also assumed that the officer will retire upon reaching twenty years of active service. Promotions to Lieutenant Commander and to Commander are assumed.

Increases in basic pay automatically occur at promotion and at designated longevity steps. Longevity step increases are designed to recognize additional experience and occur at each even-numbered year for completed years-of service from six through eighteen. Promotion to Lieutenant Commander usually occurs between nine and eleven years: this study assumes ten years. Commanders are promoted between fifteen to seventeen years of commissioned service; this study assumes sixteen years[7] [Ref. 9]. Promotion timing depends on the qualifications of the individual officer and the manpower needs of the Navy. If officers have skills that are in short supply, promotion rates tend to increase to fill required job vacancies. [8]

---

[6]Length-of-service is computed from a pay-based-entry-date. A service member's seniority for pay purpose begins when a person contracts to enter the military. Seniority for retirement includes only time spent on active duty. This results in credited length-of-service for pay purposes often being slightly longer for many individuals than length of active service used to calculate retirement credits. Officers receive approximately two years of flight training prior to becoming pilots. A five-year service obligation is incurred by each new pilot following training. The earliest a pilot may leave the Navy is therefore the seventh year of service, at the earliest age of twenty-nine.

[7]Using the earlier promotion points of nine and fifteen years would bias income towards the Navy. Those officers promoted and paid prior to ten and sixteen years will have a higher income then in this study

[8]Pilots have a high promotion rate. Over the past six years about ninety percent who remain on duty are promoted to Lieutenant Commander. Eighty percent are promoted to Commander. These rates vary yearly.

Adjustments to the basic pay rate levels are set annually by Congress. Congress intends for military wages to grow at the same rate as wages in the private sector.[9] Recent pay increases have been about three to four percent. Table 1 lists officer monthly basic pay for pay grades O-3, O-4, and O-5.

TABLE 1

OFFICER BASIC PAY TABLE
FOR FISCAL YEAR 1986

PAY-PER-MONTH

Time-in Service	PAYGRADE O-3	O-4	O-5
Under 2	$ 1,617.30	$ 1,740.30	$ 2,064.60
2	1,808.10	2,119.20	2,424.60
3	1,932.90	2,260.50	2,592.00
4	2,138.70	2,260.50	2,592.00
6	2,241.00	2,302.50	2,592.00
8	2,321.70	2,404.20	2,592.00
10	2,447.10	2,568.00	2,670.60
12	2,568.00	2,712.60	2,814.00
14	2,631.30	2,836.20	3,002.70
16	2,631.30	2,960.70	3,227.10
18	2,631.30	3,042.60	3,412.50
20	2,631.30	3,042.60	3,515.70

Source: Navy Pay Manual

2. Basic Allowance for Quarters

Basic Allowance for Quarters (BAQ) is the cash allowance provided to an officer who does not live in adequate government housing. An officer, upon reporting to a new duty station, may have the option of living in

[9]The All-Volunteer Army requires sufficient military pay to attract and retain required manpower. If military pay falls too far behind the civilian sector, military manpower shortages become acute. Congress is forced to consider pay increases or a draft to correct the manpower problem.

government or in private housing.[10] If an officer lives in government housing, all BAQ payments due him are withheld in return for housing. Additionally, all utility expenses in government quarters for water, electricity, and gas are paid for or provided by the government at no added expense to the officer. Otherwise the officer lives in private housing and receives BAQ.

Due to the shortage of government housing and the tax advantage of home ownership,[11] many officers choose to purchase or rent housing and receive BAQ. Table 2 lists BAQ pay tables for FY 1986.

TABLE 2

OFFICER BASIC ALLOWANCE FOR QUARTERS FOR FISCAL YEAR 1986

PAY-PER-MONTH

PAY Grade	Without Dependents	With Dependents
O-3	$ 355.80	$ 433.50
O-4	439.50	519.90
O-5	479.40	568.80

Source: Navy Pay Manual

[10]Officers may be required to live in government housing if units are available or at overseas locations where living off-base is prohibited.

[11]Officers, as well as private citizens, may deduct interest and some other housing expenses from their gross income for tax purposes. Since military personnel receive a tax-free allowance to cover some of these housing expenses, they receive a 'double' tax savings.

3. Variable Housing Allowance

In 1980 Congress enacted legislation implementing the Variable Housing Allowance (VHA). VHA was begun in recognition of the rapid increase of housing costs in selected areas of the United States, such as Hawaii and California. If an officer lives in government housing, all VHA payments due him are withheld in return for housing.

VHA rates are determined by an annual survey of housing costs throughout the United States. VHA varies with the actual cost of housing and utility costs experienced by military personnel of various pay grades in a particular local area. The end result is that the combination of BAQ and VHA ideally equals the housing costs experienced by the average officer in a local area.

A survey was made of local VHA rates where a Naval Aviator can expect to live during a career. These rates vary from $ 86.55 for a Lieutenant stationed in Pensaccla, Florida to $ 535.06 for a Commander in Barbers Point, Hawaii. Typical VHA rates and averages are shown in Table 3 . No attempt was made to weight the average VHA paid in relation to the number of pilots stationed at each of the selected bases. Since the majority of pilots are stationed in high-cost areas on the seacoast, rather than low cost areas, the true average VHA rate received is higher than shown in Table 3 .

Prior to October, 1985 a program known as "rent-plus" paid officers stationed in high-cost overseas locations more than the VHA rates now in effect.[12] Payments are made to cover an officer's rent or mortgage payment, average utility expenses, and moving-in, moving-out expenses, with a maximum limit placed on payments. Officers under this program prior to October 1986 will continue to receive the

---

[12]Officers receiving these higher payments prior to October 1985 will continue to receive them until they move. New officers in the high-cost areas will not.

TABLE 3

AVERAGE 1986 OFFICER
VARIABLE HOUSING ALLOWANCE

PAY-PER-MONTH

RANK	O-3	O-4	O-5
Alameda, CA	$ 292.83	$ 340.39	$ 416.17
Barbers Point, HI	527.04	511.38	535.06
Brunswick, ME	157.41	170.31	168.03
Cecil Field, Fl	148.18	203.63	201.00
Chase Field, Beeville TX	87.23	111.51	111.50
Corpus Christi, TX	210.17	246.61	257.06
Jacksonville, Fl	148.18	203.63	201.00
Key West, Fl	290.00	291.40	312.22
Kingsville, TX	104.88	135.76	135.07
Lemoore, CA	92.40	113.84	98.07
Miramar, San Diego, CA	218.77	273.72	282.85
Moffet Field, CA	316.83	350.20	374.52
Norfolk, VA	167.46	182.78	189.82
North Island, CA	218.77	273.72	282.85
Oceana, Va. Beach, VA	167.46	182.78	189.82
Pensacola, FL	86.55	106.90	93.21
Patuxent River, MD	223.32	208.72	212.69
Point Mugu, CA	234.43	271.99	267.65
Washington, D.C.	282.05	262.34	266.74
Whidbey Island, WA	123.37	110.29	116.41
Whiting Field, Milton, FL	86.55	106.90	93.21
Willow Grove, PA	201.60	247.58	248.55
AVERAGE VHA by Rank:	$ 199.34	$ 223.02	$ 229.70

SOURCE: NAVY PAY MANUAL

higher rent-plus payments. Had these rates been used, the average VHA rates in Table 3 would have been higher. Table 4 contains the maximum 1985 rent-plus payments solely for information purposes.

TABLE 4

SELECTED 1985 RENT-PLUS PAYMENTS

	PAY-PER-MONTH		
GRADE	O-3	O-4	O-5
Agana, Guam	$ 807.00	$ 807.00	$ 807.00
Bermuda	1191.00	1316.00	1316.00
Cubi Point, Philippines	673.00	673.00	610.00
Rota, Spain	338.00	341.00	397.00
Sigonella, Sicily	280.00	431.00	533.00

Source: JOINT TRAVEL REGULATIONS

4. Basic Allowance for Subsistence

The Basic Allowance for Subsistence (BAS) is intended to cover an officer's subsistence costs without regard to his pay grade or dependency status. All officers receive the same monthly cash allowance to help defray a portion of their costs of subsistence. For Fiscal Year 1986 this amount is $ 109.37.

BAS is normally increased on an annual basis by the same percentage as the increase authorized by Congress for basic pay. There is no direct correlation between BAS and the actual cost of food and subsistence experienced by officers.

C. FEDERAL INCOME TAX ADVANTAGE

Federal income tax is not charged on the amounts received by an officer for BAQ, VHA, and BAS. This tax-free income varies from $ 8,906.52 for a Lieutenant to

$ 10,894.44 for a Commander with dependents. Because the income from these allowances is not taxed, the military officer receives a substantial increase in net income, by the amount of taxes which would have been owed on these allowances had they been taxed at the officer's normal tax rate. Congress recognizes that some additional benefits are received by military members because of this tax advantage over civilians.

It is difficult to quantify accurately the actual tax advantage in dollars received by a broad group of Naval Officers since the Federal income tax rate varies substantially among officers. The higher the total gross income received, the more valuable the income tax exemption on military allowances becomes, due to the progressive nature of our tax system. The following tables give a good estimate of the additional monetary benefit of military pay due to the tax advantage, making the following assumptions for Naval officers in pay grades O-3 through O-5: (1) a single officer with no dependents, outside income, or major tax deductions. (2) A married officer with three children, a non-wage-earning spouse, no outside income, and no major tax deductions.[13] Table 5 and Table 6 show tax savings per year as a function of seniority for single and married officers. These tax savings will be used to compute average total pay received. Tax savings computed for single and married officers receiving different pay combinations are contained in Appendix A .

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[13]Tax savings were computed by calculating income tax owed on gross income received minus the personal exemption ($ 1,040 per individual and qualified dependent). The same calculations were then made on gross income minus the BAQ, VHA and BAS allowances. Less tax is owed on the smaller of the two incomes. The tax savings listed are the differences in the taxes owed on the two amounts.

TABLE 5

TAX ADVANTAGE FOR A SINGLE OFFICER RECEIVING ACIP ONLY

REPRESENTATIVE SAVINGS PER YEAR

YEARS OF COMPLETED SERVICE	SUM OF TAX FREE ALLOWANCES BAQ+BAS+VHA	TAX SAVINGS
8 YOS	$ 7,794.12	$ 2,867
9 YOS	7,794.12	2,867
10 YOS	9,262.68	3,504
11 YOS	9,262.68	3,504
12 YOS	9,262.68	3,610
13 YOS	9,262.68	3,610
14 YOS	9,262.68	3,659
15 YOS	9,262.68	3,659
16 YOS	9,821.64	4,100
17 YOS	9,821.64	4,100
18 YOS	9,821.64	4,135
19 YOS	9,821.64	4,135

Source: Computed by author from Form 1040 Internal Revenue Service Tax Tables, 1985.

D. INCENTIVE PAYS

Naval pilots may receive two additional incentive pays, one for the hazards associated with flying and one to prevent critical shortages of aviators in specific year groups with designated skills. Incentive pay is designed to induce military personnel to volunteer for certain careers, such as flying. All Navy pilots receive Aviation Career Incentive Pay and may receive Aviation Officer Continuation Pay as a supplement to regular military compensation.

Aviation Career Incentive Pay (ACIP), commonly referred to in the military as 'flight pay', was originally provided to pilots in recognition of the hazardous nature of duty involving flying aircraft. Congress enacted the Aviation Career Incentive Act of 1974 for the purpose of attracting and retaining pilots in the Armed Forces. ACIP was

TABLE 6

TAX ADVANTAGE FOR A MARRIED OFFICER
RECEIVING ACIP & ACCP

REPRESENTATIVE SAVINGS PER YEAR

YEARS OF COMPLETED SERVICE	SUM OF TAX FREE ALLOWANCES BAQ+BAS+VHA	TAX SAVINGS
8 YOS	$ 8,906.52	$ 2,383
9 YOS	8,906.52	2,383
10 YOS	10,227.48	3,035
11 YOS	10,227.48	3,035
12 YOS	10,227.48	3,143
13 YOS	10,227.48	3,143
14 YOS	10,227.48	3,232
15 YOS	10,227.44	3,232
16 YOS	10,894.44	3,675
17 YOS	10,894.44	3,675
18 YOS	10,894.44	3,771
19 YOS	10,894.44	3,771

Source: Computed by author from Form 1040 Internal Revenue Service Tax Tables, 1985.

recognized by Congress as an incentive pay to officers for undertaking a career, on a continuing basis, more hazardous than other service careers.

The Aviation Career Act of 1974 set forth the following guidelines to award ACIP.

1. An officer who regularly flies on orders will receive ACIP independent of whether at the moment he is actually assigned flying duty. In effect, all pilots receive ACIP throughout their career even when they are assigned to 'desk jobs';
2. ACIP rates are based on the length of an officer's aviation service rather than on his grade and total military service;
3. ACIP rates are highest for the years immediately following a pilot's first service obligation, which normally coincide with the retention-critical, flight-intensive, period of a career;
4. ACIP pay progressively decreases in the senior less-flight-intensive years of a commissioned career.

[Ref. 10 : section two] Table 7 lists ACIP rates.

TABLE 7

AVIATION CAREER INCENTIVE PAY RATES

Officers Years of Aviation Service	Monthly Rate
PHASE I	
2 or less	$ 125
Over 2	156
Over 3	188
Over 4	206
Over 6	400
PHASE II	
Over 18	$ 370
Over 20	349
Over 22	310
Over 24	280
Over 25	250

Source: Navy Pay Manual, section two

During the years 1978-1979 many pilots left because of the low pay of a Navy pilot relative to pay in the civilian economy in general and the airline industry in particular. In response, Congress approved a special continuation pay for aviation career officers in 1981. The Department of Defense Authorization Act of 1981 (Pub. Law No. 96-342,94 Stat. 1095 -1096) provided the Services with the ability to pay career aviators with Aviation Officer Continuation Pay (AOCP). The Navy pays AOCP as a supplement to ACIP to correct current or projected shortages of career officers in critical aviation specialties [Ref. 11: p. 1]. Since 1981, the payment specifics of AOCP have changed and will be discussed below. The United States Navy and Marines have been the only branches of the Armed Forces to pay AOCP.

Originally, in 1981, the Act provided for payment to each qualified and electing officer of up to four months basic pay for each year the officer agreed to remain on active service beyond the expiration of his obligated service. Officers qualified for such pay had to:

1. be entitled to ACIP;
2. be in a paygrade below O-7;
3. be qualified to perform "operational flying duty";
4. have at least 6 but less than 18 years of service as an officer;
5. be in an aviation specialty designated as "critical";
6. have executed a written agreement to remain on active duty in aviation service for at least one year, and
7. be on active duty.

[Ref. 12: p. 2] The Aviation Officer Continuation Pay authorized by Congress was in addition to any other pay and allowances, including ACIP, to which an officer might otherwise be entitled.

AOCP has undergone revisions in payment methods and amounts since 1981.[14] Presently AOCP is paid only to pilots in the aircraft communities listed below.

1. Medium Attack
2. Light Attack
3. Fighter/Recon
4. Carrier Anti-Submarine Warfare (ASW)
5. Carrier Anti-Electronic Warfare (AEW)
6. Carrier Electronic Warfare (EW)
7. Carrier Transport
8. Helo
9. Strategic Communications/Electronic Warfare

In 1985 some aviators eligible to receive AOCP had a choice of receiving AOCP in yearly installments or as a lump-sum payment. Also, AOCP was closely targeted to retain pilots in the shortest supply, those at sea.[15] In 1985, to receive AOCP, pilots had to meet the following criteria:

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[14] In 1981, pilots with more than six years of aviation service had the option of accepting an additional service obligation of from one to four years. AOCP was paid at the beginning of each year of additional obligated service.

[15] Sea duty has long been recognized for the increased flying hazard and arduous living conditions. Sea-based pilots are often away from home for eight to ten months, working twenty-hour days in peacetime.

1. agree to remain on active duty for three, four or six years,
2. have at least six but less than eleven years of active duty,
3. have at least six years of aviation service,
4. have completed initial service obligation,
5. be assigned primarily to one of the communities listed above[16] [Ref. 13: p. 2].

Payment could be taken in installment payments as follows:

1. Three year contract - $ 4,000 per year
2. Four year contract - $ 6,000 per year
3. Six year contract - $ 6,000 per year

The AOCP program was further modified in February, 1985 to meet an increased rate of pilot resignations. To enhance the financial attractiveness of the AOCP program, Congress approved a lump-sum payment to selected pilots [Ref. 14: p. 1]. The lump sum pays an aviator at the following rates:

1. Four-year contract - $ 24,000
2. Six-year contract - $ 36,000.

The lump-sum payment is paid to a pilot upon his acceptance of an increased service obligation to the Navy. Lump sum is a payment option for the following pilot-groups:

1. Medium Attack,
2. Light Attack,
3. Fighter/Recon,
4. Carrier Anti-Submarine Warfare (ASW),
5. Carrier Anti-Electronic Warfare (AEW),
6. Carrier Electronic Warfare (EW).

The lump-sum payment is more valuable than a bonus paid in yearly installments even though the total sums received are equal. The economic concept of present value states that a dollar received today is more valuable then one received in the future. A person may use the dollar received today to

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[16]A community refers to the pilot's primary aircraft type for which he is warfare-qualified. A Navy pilot tends to remain with one primary aircraft type, such as fighter or attack, for his career.

purchase goods at today's prices. If inflation is present, the same dollar will buy less in the future. Also, a dollar received today can be invested to increase in real value over time. Dollars received today will be more valuable than one received in the future as a function of the interest rate a person may earn on these dollars.

Those pilots eligible to receive the lump-sum payment may also elect instead to be paid in installments. Any pilot who accepts AOCP has his ACIP reduced from $ 400.00 per month to $ 306.00 per month during the time of the bonus commitment. This reduction in ACIP pay for an officer accepting AOCP pay will total $ 6,768 over a six year period, or $ 1,128 per year.

This study assumes that a Navy pilot will make a career choice to remain in the military for twenty-years or join a major airline as soon as possible following his initial service obligation. A pilot who remains will accept AOCP at the maximum rate. Military pay tables will be computed for the pilot who remains, to account for the receipt of the following different rates-of-pay:

1. Receives ACIP only, no AOCP bonus.
2. Received ACIP and AOCP on yearly installments.
3. Receives ACIP and lump-sum AOCP bonus.

Table 54 shows the pay received by an officer who receives ACIP and the the AOCP bonus including the average tax savings. Appendix A contains other pay computations.

E. OTHER MILITARY BENEFITS

All military members receive the benefits listed in Table 9 as part of their total military compensation. While these benefits may be substantial, the calculated monetary benefit to an officer-pilot was not computed. This is due to a lack of data and the off-setting benefits received by civilian pilots, such as free travel for dependents on some airline flights and medical insurance.

TABLE 8

NAVY PILOT CAREER EARNINGS
RECEIVING ACIP & INSTALLMENT AOCP

GROSS PAY-PER-YEAR

	Lieutenant 8 YOS	Lieutenant 9 YOS
Base Pay	$ 27,860.40	$ 27,860.40
BAQ	5,202.00	5,202.00
VHA	2,392.08	2,392.08
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	6,000.00	6,000.00
Tax Benefit	2,722.00	2,722.00
YEARLY PAY	$ 49,160.92	$ 49,160.92

	LCDR 10 YOS	LCDR 12 YOS
Base Pay	$ 30,816.00	$ 32,551.20
BAQ	6,238.80	6,238.80
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	6,000.00	6,000.00
Tax Benefit	3,315.00	3,382.00
YEARLY PAY	$ 54,030.48	$ 55,832.68

	LCDR 14 YOS	LCDR 15 YOS
Base Pay	$ 34,034.40	$ 34,034.40
BAQ	6,238.80	6,238.80
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	3,232.00	3,232.00
YEARLY PAY	$ 52,293.88	$ 52,293.88

	CDR 16 YOS	CDR 18 YOS
Base Pay	$ 38,725.20	$ 40,951.15
BAQ	6,825.60	6,826.43
VHA	2,756.40	2,756.40
BAS	1,312.44	1,312.44
Flight	4,800.00	4,440.00
AOCP	0.00	0.00
Tax Benefit	3,675.00	3,770.92
YEARLY PAY	$ 58,094.64	$ 60,055.36

Source: Author, Navy Pay Manuals
Note: Officer without dependents will earn less BAQ.

TABLE 9

MILITARY BENEFITS

Air Travel overseas for member and dependents in U.S. for member only

Annual leave (30 days per year all grades)

Burial Allowance

Commissary Stores (groceries at cost plus 5%)

Death Gratuity (six times monthly pays)

Dependency and Indemnity Compensation ($622 to $726)

Disability Retired Pay

Disability Severance Pay

Government Contributions to Social Security

Low-Cost Vacation Resorts and Recreation Areas

Medical Care (Members and Dependents)

Military Exchanges

Mortgage Insurance Premiums

Nondisability Retired and Retainer Pay

Nondisability Severance Pay

Retired Members Medical Care

Survivor Benefit Plan

Unemployment Compensation

Source: Navy Milpers Manual 5030240, 4210160 6230120, 4210260, 3855180 and 3860440.

F. SUMMARY

Military pay for a Navy pilot is a combination of the following pays and allowances:

1. Basic pay
2. Basic allowance for quarters (BAQ)
3. Variable housing allowance (VHA),
4. Basic allowance for subsistence (BAS),
5. Aviation career incentive pay (ACIP) or "flight pay",

6. Aviation Officer Continuation Pay (AOCP),

7. Federal tax advantage on tax-free pays and allowances.

To compare career earnings between a pilot who remains in the Navy for a twenty-year career vs. a Navy pilot who joins a major airline after his initial service obligation, I have constructed earning tables in constant 1986 dollars. Using constant dollars assumes that pay raises for each group will match the yearly inflation rate. The average tax advantage for single and married oficers are included in the Navy pilot's yearly salary calculations. This is necessary to fairly compare one group with a tax advantage to another with none. Simply put, the Navy pilot would need to receive the additional amount of his tax advantage as a civilian to achieve equivalent buying power. For those readers who wish to examine the Navy salary without the Federal tax advantage, the required tables are in Appendix A .

Table 22 lists career earnings for a Navy pilot receiving AOCP installment payments of $ 6,000 per year from the eighth through thirteenth year of military service. These Tables will be used in Chapter Five to compare the present value of career earnings. Other possible pay combinations for pilots receiving ACIP and the lump-sum AOCP bonus are contained in Appendix A .

TABLE 10

NAVY PILOT CAREER EARNINGS
RECEIVING ACIP & INSTALLMENT AOCP

Gross Yearly Income In 1986 Dollars

YEARS OF COMPLETED SERVICE	SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	TOTAL WITH FEDERAL TAX ADVANTAGES
8 YOS	$ 46,438.92	$ 49,160.92
9 YOS	46,483.92 .	49,160.92
10 YOS	50,715.48	54,030.48
11 YOS	50,715.48	54,030.48
12 YOS	52,450.68	55,832.68
13 YOS	52,450.68	55,832.68
14 YOS	49,061.88	52,293.88
15 YOS	49.061.88	52,292.88
16 YOS	54,419.64	58,094.64
17 YOS	54,419.64	58,094.64
18 YOS	56,284.44	60,055.36
19 YOS	56,284.44	60,055.36

Source: Computed by author from Table 8
Note: Computed for Officer receiving BAQ with dependents.

III. AIRLINE PILOT PAY ELEMENTS

A. INTRODUCTION

Unlike his salaried military counter part, the civilian airline pilot working for a major carrier is paid hourly based on crew position, aircraft flown, and seniority. Captains are the highest paid pilots, followed by first officers (co-pilots) and second officers (flight engineers) [Ref. 15: p. 1]. Major airlines pay pilots at different rates for flying identical aircraft and holding identical positions. This chapter's purpose is to determine accurately the yearly pay a newly-hired ex-Navy pilot can expect on average to receive from a major airline during a thirty year career. [17]

The earnings of airline pilots were largely determined according to a basic pay formula established by the National Labor Board on May 10th, 1934 (decision No. 83) [Ref. 16: p. 22]. Originally, this formula included longevity or base pay, hourly pay and mileage pay. In 1947, a forth factor, gross weight pay, was added through collective bargaining. Since that time, the pay formula has called for the sum of these four items which are discussed in detail below. Figures quoted in the following tables are taken from current pilot contracts with major airlines. The specific airlines are not referenced in the text but listed only as airline "A" and "B". This author promised confidential of airline company data.

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[17]The modal age at which military pilots are hired by airlines following the pilot's initial service obligation is thirty. The average is thirty-two. Airline pilots cease flying as captains upon reaching age 60. This allows the Navy pilot, at best, to fly thirty years with a major airline.

B. COMPONENTS OF AIRLINE PILOT PAY

1. Longevity or Base Pay

Longevity pay is paid to pilots with more than one year of service who have completed their probationary status. It varies with a pilot's length of service with an airline and sometimes with the type of aircraft the pilot flies. Longevity is not transferable between airlines. Rates are negotiated on an hourly or monthly basis. Table 11 lists longevity pay. The highest rates are paid to those pilots flying the largest aircraft.

2. Hourly Pay

Hourly pay is a negotiated rate based on the average speed of the aircraft. It is paid in addition to other rates of compensation and is paid for hours flown or credited as a captain. It is usually paid to all captains flying different aircraft at the same rate but may vary based on equipment flown. Some airline contracts call for a different rate to be paid for hours flown during day and night time periods. However, most contracts also call for a simple average of the two negotiated rates to be paid. Table 12 lists representative rates.

3. Mileage Pay

Mileage pay is a negotiated rate paid based on the speed of an aircraft multiplied by a monetary rate. In most recent contracts, this rate has been three cents per mile flown. Pilots are paid a monthly mileage pay for hours flown or credited as a captain. Pilots flying the faster jet aircraft will fly a greater distance per hour earning a higher monthly mileage pay. In computing the mileage flown by captains for flying pay purposes, the actual time from block-to- block[18] or the scheduled time from block-to-block,

[18] "Block-to-block" means that period of time beginning when an aircraft first moves from the ramp blocks and ending when the aircraft next comes to a stop at the ramp at any station or other point of termination.

TABLE 11

AIRLINE LONGEVITY PAY RATES

Major Airline Longevity Pay Table 1985

For hours flown or credited as a captain at the following hourly rate:

Major Airline Example A

	All Aircraft
1st year	$ 2.76
2nd year	3.03
3rd year	3.30
4th year	3.57
5th year	3.84
6th year	4.11
7th year	4.38
8th year	4.65
9th year	4.92
10th year	5.19
11th year	5.46
12th year & thereafter	5.73

Major Airline Example B

	B-747	DC-10	B-727
1st year	35.40	34.69	17.96
2nd year	37.44	35.82	19.16
3rd year	38.33	36.84	21.26
4th year	39.36	37.93	22.34
5th year	40.33	39.02	23.49
6th year	41.33	40.09	24.49
7th year	42.35	41.14	25.40
8th year	43.35	42.07	26.03
9th year	44.23	42.63	26.64
10th year	44.80	43.25	27.27
11th year	45.40	43.85	27.90
12th year & thereafter	46.93	46.08	30.21

Source: Major airline contracts

whichever is greater, is normally used for all flights. Table 13 shows how contracts specify the average speed of company aircraft for pay purposes, to compute this pay.

TABLE 12

AIRLINE HOURLY PAY RATES

Major Airline HOURLY Pay Table 1985

For hours flown or credited as a captain at the following hourly rate:

Major Airline Example A

Equipment	Hourly Rate
Convair 580	$ 50.68
DC-9	85.16
B-727	85.16

Major Airline Example B

	DAY	NIGHT
1985	$ 82.75	85.25

Source: Major airline contracts

TABLE 13

AIRLINE MILEAGE PAY

For hours flown or credited as a captain at the following hourly rate:

Major Airline Example A

EQUIPMENT FLOWN	MPH	PAY/HOUR
Convair 580	350	$ 10.50
DC-9	550	16.50
B-727	550	16.50

Major Airline Example B

B-727	525	$ 15.75
DC-10	525	15.75
B-747	525	15.75

Source: Major airline contracts

4. Gross Weight Pay

Gross weight pay is paid at a rate normally three cents for each thousand pounds of certified aircraft rate. As aircraft have become larger, this pay has become greater than in the past and more important to a pilot's total income. Table 14 shows negotiated weights of selected aircraft and corresponding gross pays.

TABLE 14

AIRLINE GROSS WEIGHT PAY

For hours flown or credited as a captain at the following hourly rate:

Major Airline Example A

EQUIPMENT FLOWN	GROSS WEIGHT	PAY/HOUR
Convair 580	55,000	$ 1.65
DC-9	198,000	5.94
B-727	198,000	5.94

Major Airline Example B

B-727	174,000	$ 5.22
DC-10	532,000	15.96
B-747	765,000	22.95

Source: Major airline contract

5. Special Pays

Pilots receive special pays for international flying and for using special navigation equipment. International flying rates vary from $ 1.25 per hour for a junior pilot to $ 3.50 for a captain. When a navigator specifically assigned navigation duties is not onboard an aircraft flying internationally, captains typically receive $ 3.00 per hour, first officers $ 2.00 per hour, and second officers $ 1.00 per hour.

6. Other Pays

Pilots are paid monthly for expenses they incur while performing their duties. Expense payments are commonly paid separate from hourly wages and are not subject to withholding taxes. The following are the most common expenses for which pilots receive refunds:

1. Overseas duty expenses paid to pilots stationed permanently overseas.
2. Non-domicile pay, paid when, for the convenience of the company, a pilot is temporarily assigned to fly from a city away from his permanent home.
3. Expenses incurred for transportation away from his permanent home when transportation is not provided.
4. Hotel expenses incurred during lay-overs at cities away from home.
5. Meal expenses, typically calculated at $ 1.25 per flight hour.

These pays are not included as pilot wages or recorded on pilots' W-2 Federal wage records.

C. PAY COMPUTATIONS

The sum of the four major pays, longevity, hourly, mileage, and gross weight, is the hourly wage of the aircraft captain. The first and second officer each receive a set percentage of a captain's pay for the aircraft on which they crew. Only longevity pay is normally paid based on the individual pilot's longevity, rather than the captain's longevity. Table 15 shows the relative percentages of a captain's pay paid to first and second officers.

Computing a pilot's monthly pay requires knowledge of the pilot's position in the crew, the type of aircraft, and the number of hours flown. Pay is a product of hours flown, a captain's hourly pay rate for the aircraft, the pilot's percentage of the captain's pay based on crew position, and longevity pay as shown in equation 3.1 .

TABLE 15

FIRST AND SECOND OFFICER PERCENTAGE OF CAPTAIN'S PAY RECEIVED

Major Airline Longevity Pay Table 1985

For hours flown or credited as a captain

	First Officer	Second Officer
1st year of longevity	50%	42%
2st year of longevity	60%	50%
3rd year of longevity	61%	53%
4th year of longevity	62%	55%
5th year of longevity	62%	55%
6th year of longevity	63%	56%
7th year of longevity	64%	57%
8th year of longevity	65%	58%
9th year of longevity	66.5%	59%
10th year of longevity	67.5%	59.5%
11th year of longevity	68%	59.5%
12th year of longevity	68%	60%
and thereafter	68%	60%

Source: Major airline contract.

Pilot Pay = (Hours Flown) x {(Position Percentage) x (Gross + Hourly + Mileage Pay) + Longevity Pay} (eqn 3.1)

D. PILOT PROBATIONARY WAGES

A first-year probationary pilot receives none of the pays discussed earlier. Instead, he receives a small monthly salary regardless of the aircraft or hours flown. Table 16 lists 1980, 1984, and 1985 probationary pilot wages.

E. MINIMUM PAY GUARANTEE

The majority of pilot contracts with the major airlines contain a formula to compute a minimum monthly guarantee of sixty-eight (68) hours of flying pay (longevity, hourly, mileage and gross weight pay) computed at the composite captain, first or second officer pay rates.

TABLE 16

AIRLINE PILOT PROBATIONARY WAGES

AIRLINE	YEAR: 1980	1984	1985
	GROSS PAY PER MONTH		
American	$ 1,438	$ 1,690	$ 1,500
Continental	1,200	1,250	1,250
Delta	1,000	1,000	1,000
Eastern	1,050	1,375	1,325
Flying Tigers	N/A	1,500	1,500
Northwest	1,150	1,500	1,400
Pan AM	N/A	1,500	1,500
Piedmont	950	1,100	1,100
Republic	1,000	1,325	1,219
TWA	1,350	1,350	1,350
United	1,384	1,500	1,800
USAir	940-1,030	1,250	1,250
Western	N/A	1,200	1,500

Source: FAPA

This establishes a wage "base" for pilots. In addition, a pilot who flys more than average in one month may "bank" those excess hours to use for pay purposes in a month when fewer hours are flown. Also of note is that airlines and the Federal government have "caps" on the number of hours a pilot may fly. This limits maximum earnings.

IV. COMPUTATION OF MAJOR AIRLINE AVERAGE PAY

A. INTRODUCTION

"Certainly, by any standards, one must conclude airline labor has been very generously rewarded over the years. These jobs are the envy of many Americans."

Dr. George W. James [Ref. 17]

Major airlines pay their pilots at different wage rates. First and second oficers receive a percentage of the aircraft captain's pay. A pilot's pay is determined by the hours he flies, his seniority, and the airline for which he works. The importance of hours flown is demonstrated by the pilot's wage equation 4.1 .

$$\text{Pilot Pay} = (\text{Hours Flown}) \times \{(\text{Position Percentage}) \times (\text{Gross} + \text{Hourly} + \text{Mileage Pay}) + \text{Longevity Pay}\} \qquad \text{(eqn 4.1)}$$

Since pay for all but a probationary pilot is based on hours flown, pilots who fly more earn more.

Seniority plays a crucial role in pilot pay. All "jobs," the position of the pilot, the aircraft flown, and the aircraft route, are bid on by company pilots monthly or quarterly. The largest aircraft and longest non-stop routes pay the highest hourly rates. Pilots with sufficient seniority are able to fly the highest-paying aircraft and routes. Beginning pilots usually crew on smaller aircraft flying frequent short distance commuter flights. Since pilots are paid based on hours flown, junior pilots flying short routes must work longer than pilots making longer flights[19] to earn the same flight time.

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[19]Short flights involve more frequent stops to load and unload passengers. Time spent at an airport does not fully

The individual airline for which a pilot flies affects career earnings because pay formulas and flying opportunities differ across companies. Also, the financial strength of a company affects pilot promotion rates and lay-off probabilities. Rapidly expanding airlines, such as Piedmont, rapidly promote pilots to captain. Promotion to captain, for example, usually means a forty percent higher wage than that of a first officer. Expanding airlines offering rapid promotions but a below average pay scale may actually offer a pilot higher career earnings due to an above average promotion rate. Also, more pilot flight hours will probably be available with expanding airlines. Weaker, non-expanding airlines offer few if any promotions. Pan-American airlines, for example, furloughed many pilots after deregulation; many captains and first officers were demoted. Financially weak airlines frequently ask for pilot wage reductions. If they don't get these reductions they may go bankrupt, as did Brantiff and Continental. A reduction or halt in promotion opportunities adversely affects present and future pilot earnings. A company bankruptcy or massive pilot lay-off may cripple pilot earnings.

Although pilot skills are general and transferable from one airline to another, union rules usually prohibit an unemployed senior pilot from being laterally hired by another airline at his old pay. A pilot joining another union airline usually begins near the bottom of that company's pilot wage scale. In summary, while some airlines pay scales may appear high, one must be promoted to captain to earn them and remain with the company for a full career to benefit significantly from them.

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count as paid flight time.

I have researched available information sources to determine the present average wage a new pilot can expect to receive yearly based on his seniority. All elements of research will be discussed individually.

B. FORECASTING AIRLINE PILOT WAGES

1. Past Studies

The initial step was to search for any studies which computed either airline pilot wages as a function of the pilot's seniority with the company or an average pilot wage over a career. Computer searches failed to find any relevant studies.

Data on pilots' wages were obtained from Future Aviation Professionals of America (Decatur GA.), the U. S. Department of Labor, Bureau of Labor Statistics (Washington, D.C.), the Airline Pilots Association (Washington, D.C.), individual airline contracts, and the Airline Transport Association (Washington, D.C.). Only the Air Line Pilots Association had available pilot data based on pilot age and seniority. Moreover, no group had forecast pilot average career earnings. Studies comparing Navy officer-pilot pay to airline pilot pay used the average wage of an airline pilot for the years studied. My investigation found that using the average pilot pay for airlines was unsuitable because it skewed airline earnings to a higher than actual level [Ref. 18]. The reason is as follows: as the airline industry enters a recession, junior pilots are furloughed. The average airline pilot wage increases as the lower-paid junior pilots leave [Ref. 19]. To truly capture the career earnings of a future pilot, the research must take into account the possibility of these lay-offs sometime during a career. The use of average wages in a study fails to capture the 'true' potential wage flow during a pilots career.

2. Airline Contract Survey

There are, in the United States, fourteen major airline companies.[20] Thirteen of the major airlines were surveyed. Additionally, nine of the eighteen larger national airlines were contacted with requests for pilot contracts and wage histories.[21]

Contracts were obtained from seven major and four national airlines.[22] These contracts were used to develop probable pilot salaries over a career based on probable crew position and aircraft flown. The probable crew position and aircraft flown by a representative pilot was computed using Markovian analysis and the total number and mix of company aircraft. A normal pilot promotion rate from the lowest through highest paying positions was assumed. This method, while extremely useful in determining the first four years of earnings of a pilot's career, was found not to be accurate beyond the six-year mark when compared with actual pilot earnings. This may be caused by fluctuations in promotions by individual airlines and the individual pilot's desire to be promoted or to work longer hours. Appendix B contains a Markovian analysis of one airline and a more detailed explanation of the Markov model.

In 1978 airline deregulation brought turmoil to the airline industry. Profits fell and pilot promotion rates became erratic. Healthy, expanding airlines rapidly increased their work force. Pilot promotions were accelerated. Weaker airlines, such as American, furloughed many pilots after deregulation yet still retained 1,400

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[20]Major airlines are defined by the U. S. Department of Labor as those companies with one billion dollars or more in yearly revenues.

[21]National airlines earn from $ 75 million to $ 1 billion dollars a year. Among the most well-known national airlines are Frontier and People Express.

[22]The companies contacted will not be referenced by name due to the promise of non-disclosure by the author.

non-flying pilots on the payroll [Ref. 20: p. 41]. Laying off pilots effectively demotes pilots who remain. Some captains and first officers must move back to fill the vacated second officer seats. For these reasons, forecasting pilot salary based on airline contracts and assumed promotion rates, although informative, was deemed unreliable for forecasts of thirty year pilot career earnings.

C. REGRESSION ANALYSIS OF AIRLINE PILOT WAGES

1. Pilot Union Data

The Airline Pilots Association represents nearly all pilots of the major airlines. The exceptions to ALPA representation are American Airlines and Federal Express. Together, the major airlines employ approximately 29,600 pilots. Very accurate 1983 wage data for all ALPA members based on age, seniority, airline, and type of aircraft were obtained courtesy of the Airline Pilots Association. Data for American Airlines, which is not represented by the ALPA, or Continental Airlines, which has been on strike, were obtained from union contracts and from the Future Aviation Professionals of America. The only data which could be obtained on Federal Express pilots was the maximum yearly earnings estimates from FAPA. For this reason, Federal Express, a cargo-only company employing approximately 600 pilots, or two percent of all major airline pilots, was dropped from this survey.

2. Industrial Data of Maximum Pilot Wage Estimates

The Future Aviation Professionals of America, FAPA, formerly known as Future Pilots of America, publishes a pilot salary survey yearly which is widely reported and used by the press to report pilot wages. FAPA receives its data from two sources: pilots who are members of FAPA and snapshot wage information from the Airline Pilots Association. FAPA's main objective is to promote the beginning aviation careers of prospective pilots with the major and national

airlines. FAPA offers job counseling prior to airline interviews, medical information, and other forms of support to an aspiring pilot.

The wage survey published by FAPA lists the maximum wages which a pilot can expect to receive [Ref. 21]. Table 17 lists 1985 maximum pilot wages as published by FAPA. However, a pilot now joining an airline may never receive these maximum wages for the following reasons:

1. These maximum wages listed are for the companies' most senior pilots flying the largest, highest paying aircraft. Senior captains with many of the companies have between twenty-nine and thirty-three years seniority. An ex-military pilot, who is, on average, thirty-two years old when initially hired by the airlines, will reach a maximum of twenty-seven years pay seniority. Also, the seniority structure of most major airlines is highly pyramidal with a relatively small percentage of pilots earning the maximum wages.

2. Maximum and tenth year salaries listed by FAPA include those companies which have an upper and lower two-tiered wage scale. This relatively new wage concession by the pilots' union retains the high wages for pilots now flying with the company. New pilots typically may earn only half of the present listed maximum salaries.

3. Maximum salaries are based on a pilot flying the maximum flight hours offered by the airline. The average pilot surveyed by the Department of Labor however, does not fly these maximum rates and hence, does not receive the maximum pays listed. The average hours flown will be documented at the end of this Chapter.

4. No allowance is made for loss of salary due to low promotion rates, lay-offs, strikes and the total loss of wages during some portion of a pilot's career.[23]

3. Airline Union Data of Actual Pilot Wages

ALPA collected from pilot's Federal W-2 tax forms all wages a pilot received during calendar year 1983 [Ref. 22: p. ii]. These data are recorded for each pilot who earned at least one dollar during calendar year 1983. If newly hired pilots, who would work less than a full

[23]Temporary lay-offs are not uncommon among junior airline pilots. They frequently joke that you're not really sure you are an airline pilot until you've been laid off.

TABLE 17

1985 FAPA MAXIMUM PILOT WAGE ESTIMATES

[1] MAXIMUM GROSS YEARLY EARNINGS

	YEAR OF SERVICE			
Airline	1	2	10	MAXIMUM
American [2]	$ 18,000	$ 22,000	$ 78,732	$ 123,312
Continental [3]	15,000	27,000	50,004	50,004
Delta	12,000	38,400	78,000	156,000
Eastern	15,900	36,216	69,600	138,000
Flying Tigers	18,000	33,600	132,000	174,000
Northwest	16,800	55,860	119,016	152,664
Pan AM	18,000	30,000	67,200	138,000
Piedmont [4]	13,200	39,444	130,512	127,764
Republic	14,628	25,944	83,904	83,904
TWA	16,200	25,200	56,400	139,200
United	21,600	26,400	73,200	160,800
USAir	15,000	33,000	84,000	138,000
Western	18,000	25,152	52,800	78,000

Source: FAPA 1985 Pilot Wage Survey

NOTES:
1. FAPA original publication listed wages for probationary, second and tenth year pilots as pay-per month. Author has converted tables to pay per year for ease of comparison.
2. American salaries for years ten and maximum are for the old pay scale. New hired pilots can expect to earn half of the old wage scale.
3. Continental Airlines strike wages displayed. Company cut pilot wages by 50% or more by declaring bankruptcy.
4. FAPA Piedmont 10th year wage listed as $ 10,876 per month, or higher than maximum salary rate.

calendar year, were included in this study, their lower wages would skew the data towards a lower average airline

wage. To prevent this, all data for those workers of less than three years seniority were discarded. This is valid since the first year's probationary pilot wage is known with certainty and the probable second year salaries can be computed from FAPA maximum salaries adjusted for average pilot hours flown.

Using actual pilot wages for a full calendar year captures nearly all wage variables. Pilots who seek rapid or slower promotions, who fly few or many hours, or who fly smaller rather than larger aircraft by choice are all represented. The data set of twenty-thousand pilots over the span of pilot seniority represents the earnings of many different career paths. A regression analysis of the pilot wage data by individual airline was completed using a statistical SAS program [Ref. 23]. The goal was to explain pilot's wages as a function of seniority. Table 18 displays the regression results and the corresponding R - squared value for each individual company's equation. A pilot's wage was assumed to be a function of a pilot's company seniority. The equation for pilot wages used is:

$$\text{Pilot Pay} = \text{Base pay} + (\text{Seniority} \times \text{Y Variable}) \qquad \text{(eqn 4.2)}$$

How well does pilot seniority predict earnings? The R-squared value shown in Table 18 for each airline predicts the general strength of the linear relation between seniority and wages. The stronger the correlation, the better seniority predicts wages. An R-squared value of 1.00 would show a perfect correlation between seniority and wages, while an R-squared value of 0.00 would indicate no effect of seniority on wages. In these equations, seniority is seen to highly predict wages received. R-square values range from 78.0 to 97.3. This makes intuitive sense. Airline wages are based on crew position and hours flown.

TABLE 18

1983 AIRLINE PILOT WAGES
REGRESSION EQUATIONS

SUMMARY OF PILOT WAGES REGRESSION ANALYSIS
VALID YOS SIX TO THIRTY

AIRLINE	Regression Equation
American	Note 1.
Continental	Note 1.
Delta	Pay = $ 43,908 + 3,308 (YOS)
Eastern	Pay = $ 28,068 + 2,670 (YOS)
Flying Tigers	Pay = $ 50,111 + 2,882 (YOS)
Northwest	Pay = $ 25,585 + 3,807 (YOS)
Pan AM	Pay = $ 34,291 + 2,409 (YOS)
Piedmont	Pay = $ 44,039 + 2,520 (YOS)
Republic	Pay = $ 61,443 + 1,740 (YOS)
TWA	Pay = $ 17,194 + 2,989 (YOS)
United	Pay = $ 9,169 + 3,871 (YOS)
USAir	Pay = $ 42,336 + 302 (YOS)
Western	Pay = $ 22,179 + ,646 (YOS)

AIRLINE	R Squared Value
American	Note 1.
Continental	Note 1.
Delta	96.9
Eastern	97.3
Flying Tigers	78.0
Northwest	81.6
Pan AM	93.7
Piedmont	83.6
Republic	79.0
TWA	90.6
United	95.0
USAir	95.0
Western	96.2

Note 1: ALPA data not available on these airlines.
Note 2: (YOS) is completed years of service with the airline. A probationary pilot has zero YOS.
Note 3: Valid ranges of regression equations listed in Appendix C. Equations estimate years of service from six to thirty.

The more senior of the pilots bid to fly the larger aircraft on the higher-paying routes. This leaves the lower-paying beginning positions to those pilots with the least seniority.

Table 19 displays the predicted salaries received by airline pilots in 1983 for a pilot hired at age and thirty. This is the mode age at which ex-military pilots are hired by the major airlines following an initial service obligation.[24]

TABLE 19

AVERAGE 1983 PILOT WAGES COMPUTED FROM REGRESSION ANALYSIS

PILOT HIRED AT AGE THIRTY
GROSS PAY PER YEAR OF SERVICE

AIRLINE	10	29
American[1]		
Continental[1]		
Delta	$ 78,485	$ 135,205
Eastern	56,512	107,068
Flying Tigers	76,581	137,767
Northwest	60,142	139,396
Pan AM	55,445	105,389
Piedmont	76,066	116,110
Republic	70,747	112,477
TWA	46,629	105,599
United	83,234	126,456
USAir	73,341	136,825
Western	48,639	99,913

Source: Author

Note 1. American and Continental wages not regressed.

Note 2: (YOS) depicted indicates beginning-year seniority. A probationary pilot has zero YOS.

Note 3: Ranges of regression equations listed in Appendix C .

Note 4: Equation is Pay = base wage + seniority times Y variable. Ex-military pilots will usually achieve a maximum seniority of twenty-nine years.

[24]The maximum seniority used in the regression equations for ex-military pilots will be twenty-nine years because pilots must retire upon reaching age sixty.

D. CORRECTIONS TO MAXIMUM AIRLINE PILOT SALARY ESTIMATES

1. Average Hours Flown

The career pilot wages developed from the regression equations displayed in Table 19 for 1983 are less than the maximum pilot wages FAPA predicts for 1985. The lower wages may be explained by the fact that pilots fly, on average, fewer hours than FAPA used to estimate maximum pay. Airline pilot pay has been shown to be a function of the hours a pilot flies per month times the negotiated pay rate of the airline. While airlines may guarantee pilots a minimum number of hours (typically sixty-eight hours per month) FAPA assumes each pilot is flying a maximum number, usually eighty,[25] However pilots, on average, over a career do not fly eighty or more hours per month and, therefore, do not receive the full maximum income flow projected in Table 17 .

Union-negotiated contracts also limit the maximum hours a pilot may fly in any month. Pilots at American Airlines for example are limited to flying 78 hours for five months of the year and 75 hours a month for the remainder [Ref. 24]. This yearly maximum for American pilots equals 76.25 hours per month and is less than the 78 hours per month for American used by FAPA in Table 17 .

Information from the United States Department of Labor listing average hours flown by pilots of major and national airlines from 1970 to 1984 was used to compute a weighted average of actual hours flown by the pilots of the major airlines. Appendix D contains the survey data. These surveys list the number of pilots surveyed and the range of hours which they flew during the survey period. Weights were assigned to the data in relation to the number of pilots flying in each five-hour grouping of monthly flight hours. The weighted averages are listed in Table 21 . The

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[25]The average number of flight hours used by FAPA in their 1985 pilot salary estimates was 80.86 flight hours per month.

simple average of 74.4 pilots hours per month is eight percent less than the 80.86 hour average listed by FAPA in their 1985 Pilot Salary Survey. Table 22 lists the differences, as a percentage, between the FAPA maximum pilot hours projected and the Department of Labor ten-year pilot hour average computed by the author. Since pay is directly tied to hours flown, the decrease in pilot hours will explain a nine percent difference between FAPA's estimate and the wages shown in Table 19 .

TABLE 20

FAPA MAXIMUM ESTIMATED FLIGHT
HOURS PER MONTH FOR MAJOR AIRLINE PILOTS 1985

AIRLINE	number of flight hours per month
American	78
Continental	83
Delta	78
Eastern	83
Flying Tigers	80
Northwest	75
Pan AM	80
Piedmont	80
Republic	80
TWA	80
United	80
USAir	85
Western	85
AVERAGE HOURS	80.86

Source: 1985 FAPA Pilot Wage Survey

TABLE 21

AVERAGE PILOT FLIGHT HOURS
1975-1984 FOR MAJOR AIRLINES

	Minimum	Maximum	Average
Captain	72.2	77.2	74.7
First Officer	72.3	77.3	74.8
Second Officer	72.5	77.5	75.0

Weighted average for all pilots: 74.4 hours

Source: Computed by author from data in Appendix D.

TABLE 22

PERCENTAGE DIFFERENCE IN PILOT HOURS
BETWEEN MAXIMUM AND AVERAGE ESTIMATES

AIRLINE	FAPA ESTIMATE	Ten-Year Average	Percentage Difference
American	78	74.4	-.05
Continental	83	74.4	-.12
Delta	78	74.4	-.05
Eastern	83	74.4	-.12
Flying Tigers	80	74.4	-.08
Northwest	75	74.4	-.01
Pan AM	80	74.4	-.08
Piedmont	80	74.4	-.08
Republic	80	74.4	-.08
TWA	80	74.4	-.08
United	80	74.4	-.08
USAir	85	74.4	-.14
Western	85	74.4	-.14
AVERAGE	80.86	74.4	-.09

Sources: Author, FAPA 1985 Pilot Salary Survey

E. POST-1983 PILOT PAY CHANGES

Locals of the Air Line Pilots Association (ALPA) have accepted wage deferrals or reductions forty-five times since 1980 [Ref. 25: p. 127]. Table 23 lists a summary of wage changes since 1983 experienced by major airline pilots. Only the pilots of one airline, Northwest, have received a pay increase. Table 24 lists the projected pilot 1986 wages for an ex-Navy pilot initially hired at age thirty adjusted for these post-1983 wage changes. Appendix E contains an abstract of wage changes in detail along with reference sources.

An accurate pilot wage base has been developed for 1983, using regression analysis for pilots with seniority above seven years. By applying the salary increases and decreases pilots have experienced since 1983, we can get an accurate picture of the probable average 1986 salary. This will be done in the following manner:[26]

1. The FAPA first year salary will be used.
2. FAPA maximum second-year salaries will be reduced by the percentage difference between a pilot flying maximum hours and one flying the industrial average.
3. The pilot's tenth year and maximum salary will be based on the 1983 company regression salary modified for company pay changes since 1983. Reductions for years 3 through 6 of current two-tiered wage scales are not used. If included, they would slightly reduce the average airline pilot's salary. These reductions could not be verified by the author prior to publication of this thesis.

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[26]However FAPA's second year salary was too high for Northwest Airlines. Using the current union contract and promotion schedule a Northwest pilot will be earning 42 % of $ 122.93 per hour and flying 74.4 hours per month. Yearly earnings will be $ 46,095 vs. $ 55,301.

TABLE 23

MAJOR AIRLINE WAGE CHANGES
1983 TO 1985

AIRLINE	
American	50 % reduction, $ 65,000 top pay
Continental	50 % reduction
Delta	No Change
Eastern	22 % Reduction
Flying Tigers	No Change
Northwest	14 % Pay Increase
Pan AM	Delayed Pay Increases No change.
Piedmont	28 % Pay Reduction for first seven years.
Republic	10 % Reduction years 1 - 3 15 % Reduction after first year
TWA	No Change
United	42 % Reduction first year average 10 % Average reduction years 2 - 5 reduction probably permanent.
USAir	No Change
Western	30.5 % Wage reduction

Source: Appendix E .

F. MAJOR AIRLINE PILOT AVERAGE CAREER PAY

1. Weighted Averages

Now, an accurate average wage structure for each of the major airlines has been determined for a new pilot hired in 1986. An individual pilot may earn more or less than Table 24 predicts, as an individual function of wage variables and personal preference. Now, to determine the average career-pay of a new pilot entering the industry, the weighted average of the wages in Table 24 must be calculated. Using weighted averages assumes a pilot's chance of

TABLE 24

AIRLINE PILOT AVERAGE YEARLY CAREER EARNINGS
FOR PILOT HIRED AT AGE THIRTY

	YEAR OF SERVICE			
AIRLINE	1	2	10	29
American	$ 18,000	$ 20,900	$ 39,366	$ 65,000
Continental	15,000	23,760	50,004	50,004
Delta	12,000	36,480	78,485	135,205
Eastern	15,900	31,870	44,079	83,513
Flying Tigers	18,000	30,912	76,581	137,767
Northwest	16,800	46,095	68,562	158,911
Pan AM	18,000	27,600	55,445	105,389
Piedmont	13,200	36,288	67,698	116,110
Republic	14,628	23,868	60,135	95,605
TWA	16,200	23,184	46,629	105,599
United	12,528	24,288	83,234	126,456
USAir	15,000	28,380	73,341	136,825
Western	18,000	21,630	33,804	69,440

Source: Author

being hired by and or remaining with an airline equals the number of pilots employed by the airline divided by the total number of pilots in the entire industry.

Table 25 lists the major airlines, the number of pilots employed with each company, and the fraction of total major airline pilots employed by each airline. By assigning weights to the salary for a new thirty-year old pilot displayed in Table 24 in proportion to the percentage of pilots employed by each company, a true industry average wage for a newly hired pilot may be determined. Table 26 displays the results of applying the weighted pilot averages determined in Table 25 to the salaries in Table 24 .

2. Pilot Average Career Pay Computations

By applying the weighted averages in Table 25 to the company pay scale developed in Table 24 an accurate 30-year airline pilot salary, expressed in constant 1986 dollars, may be projected for the average ex-military plot. Some pilots, such as those working for Northwest and Delta, may make more than others, such as ones with American or Western; nothing is guaranteed. Table 26 projects a career salary for an average pilot flying the average number of flight hours for his company. The assumption is made that no further changes in the airline industry pilot wage structure will occur. If this assumption is relaxed, airline pilot wages could be projected lower since the trend has been towards lower pilot wages since airline deregulation in 1978.

TABLE 25

PERCENTAGE OF PILOTS EMPLOYED BY EACH MAJOR AIRLINE

AIRLINE	# AIRCRAFT	# Pilots	Airline Percent of Total Pilots
American	237	3,437	.118
Continental	90	1,400	.048
Delta	227	3,773	.130
Eastern	278	3,475	.119
Flying Tigers	31	682	.023
Northwest	109	1,698	.058
Pan AM	126	1,627	.056
Piedmont	88	919	.032
Republic	163	1,616	.056
TWA	156	2,791	.096
United	316	4,934	.170
USAir	124	1,462	.050
Western	73	1,261	.043
	TOTAL:	29,075	1.000

Source: ALPA and World Aviation Directory.

TABLE 26

THIRTY YEAR FORECAST OF AIRLINE PILOT AVERAGE YEARLY EARNINGS

Gross Yearly Earnings In 1986 Dollars

YOS		YOS	
1	$ 15,147	16	$ 71,813
2	28,305	17	73,863
3	31,028	18	75,972
4	34,053	19	78,142
5	37,411	20	80,371
6	41,140	21	82,666
7	45,280	22	85,025
8	49,878	23	87,453
9	54,984	24	89,949
10	60,654	25	92,518
11	62,386	26	95,159
12	64,166	27	97,875
13	65,988	28	100,669
14	67,882	29	103,543
15	69,820	30	106,499

Source: Author
Note 1. 1986 Dollars.
2. Computed from age thirty to sixty.

V. THE EFFECT OF AIRLINE DEREGULATION ON PILOT EARNINGS.

"With airline labor accounting for more than thirty-five percent of airline costs, and receiving employee compensation more than seventy-five percent above the U.S. average, it is essential that downward adjustments in labor costs are achieved . . . . If they are not, bankruptcies, mergers, layoffs and other actions clearly demonstrate that the companies cannot continue to do business as usual, and labor and consumers will lose."

Dr. George W. James [Ref. 26]

A. INTRODUCTION

The Civil Aeronautics Act of 1938 gave the existing United States domestic airline industry monopolistic regulatory protection. This regulatory scheme was allegedly designed to strengthen and promote air transportation in the United States through regulation and protection. The Act accomplished this by:

1. Limiting the number of airlines by preventing new entrants into markets.
2. Restricting the routes and number of flights flown by individual airlines.
3. Required government approval for the airline's ticket pricing structure. This passed along increased costs to the public and set a floor on ticket prices which prevented price competition.

Those airlines which existed under this regulatory market expanded and profited from 1938 to the advent of airline deregulation in 1978.[27]

The Civil Aeronautics Board (CAB) enforced airline regulations. A rate of return on investment was used to set ticket prices. Since airlines could pass on labor costs to consumers, pilots had great bargaining power to increase their wages. Airlines found it easier to increase pilot wages than to endure a strike that halted airline

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[27]These major airlines were: American, Delta, Eastern, Northwest, TWA, and United.

operations. In this environment, pilot's wages rapidly increased from the early 1960's through 1978. Senior pilots for major airlines earned in excess of $ 130,000 per year. Between 1969 and 1979 the average total compensation per airline employee nearly tripled [Ref. 27]. This increase was sixty percent more than the increase in inflation.

B. AIRLINE DEREGULATION

The 1978 Airline Deregulation Act was a result of growing public support for deregulation in general and of problems encountered by tne CAB while attempting to regulate the airlines. The stable and prosperous airline industry suffered two setbacks in the 1970's. As wide body jets were purchased, airline seat capacity outstripped passenger demand. The Arab fuel embargo rapidly escalated fuel expenses. Both events severely hurt airline profits. The CAB in the past would have passed these cost increases on to the public through higher ticket prices. Faced by growing public sentiment to deregulate, the CAB began to favor increased competition. The consensus was that the airlines would be better off without formal regulation.

The Deregulation Act of 1978 cleared the way for airline competition and eliminated protective pricing policies. Over a period of six years the Act specifically:[28]

1. Eliminated restrictions on new domestic airlines' entry into the market.
2. Eliminated restrictions on new routes to additional cities.
3. Simplified the process for dropping airline service to selected cities (elimination of unprofitable routes).
4. Eliminated all airline cargo/passenger restrictions.

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[28]Restrictions frequently forbid competition between certain cities. This resulted in inefficiencies. An airline flying a route from cities A to B and from C to D may have been forbidden to carry its passengers from city B to C. The plane could continue flying empty or with cargo. Once in city C, the plane could again fly passengers.

5. Allowed pricing competition. Airlines could, without approval set fares fifty percent below or five percent above a 1977 standard industry fare level.

The introduction of competition had a profound effect on the airline industry and its employees.

C. AIRLINE EARNINGS

Major airline earnings were no longer protected by regulation. Increased competition from new sellers, such as People Express, forced ticket prices down on routes serviced by these new airlines. Airline net revenues decreased as airlines used discounted airfares and promotional activities (frequent flyers programs) to fill more airline seats. Ticket-pricing competition severely eroded profits. The percentage of total coach traffic flying at a discount rate increased from forty-two in 1978 to eighty-eight in 1983 [Ref. 28: p. 22]. Increased operating costs, more competition, and lower ticket prices decreased major airline profits from $ 1.1 billion in 1978 to only $ 542 million in 1984.[29]

To survive an airline must on average be profitable. But many airlines failed, the most prominent being Brantiff. A bankrupt airline severely decreases pilot earnings, and even the threat of bankruptcy drives down pilots' wages.

D. THE POTENTIAL FOR AIRLINE BANKRUPTCIES

Increased competition has decreased the major airlines' profitability. Following deregulation, only four major airlines consistently operate with an above-average profit.[30] The major airlines have struggled to maintain their market share of passenger travel. Only Republic and USAIR have improved their market share since 1978 [Ref. 29: pp. 50-53]. Bankruptcy severely decreases pilots' earnings.

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[29]1984 profits of $ 800 million adjusted for inflation and displayed in constant 1978 dollars.

[30]Northwest, Republic, USAIR and Delta normally operate at a profit level above that of the other major airlines.

Pilot jobs are completely lost or they suffer substantial pay cuts. For example, after Continental went bankrupt, its pilots received a fifty percent pay cut.

Since deregulation the major airlines have struggled to adapt to a new competitive market environment. Table 27 displays the net operating profits and losses of the major airlines for 1978, 1983 and 1984. The industry suffered large losses from 1979 to 1982.[31] Note in Table 27 the increased profitability of the airlines, such as Continental, that had obtained wage concessions.

TABLE 27

AIRLINE NET PROFITS AND LOSSES
1978, 1983, 1984

Net Yearly Profit or (Loss) ($ Mil.)

	1978	1983	1984
American	97.0	$227.9	233.9
Continental	60.0	(218.4)	50.3
Delta	216.0	(13.9)	258.6
Eastern	97.0	(183.7)	(37.9)
Northwest	68.0	50.1	56.0
Pan Am	173.0	(58.0)	(206.8)
Republic	55.0	(111.0)	29.5
TWA	49.0	(12.4)	29.9
United	289.0	142.0	282.4
U.S. Air	34.0	80.6	121.6
Western	51.0	(54.5)	(29.2)
TOTAL	$ 1,189.0	$ (151.3)	$ 788.3

Sources: Shearson Lehman Brothers; and Melvin A. Brenner, Airline Deregulation, ENO Foundation for Transportation, Westport, Connecticut, 1985.

Note: 1983 losses partially attributed to economic recession.

[31] Increased competition, rising expenses and a severe recession all contributed to lost airline profits.

Table 27 shows that American, Delta, Northwest, United, and USAIR seem to have adapted to the deregulation environment. Eastern, Pan American, and Western are incurring losses, adding to their debt and to future problems. While Eastern and Pan American offer new pilots a high salary structure, a prospective pilot should question their ability to pay these high wages in the future.[32] Airlines in financial trouble seek to lower all costs including wages. American Airlines is an example of a company which chose to suffer strikes to gain wage concessions from company pilots. American is now a profitable and stable employer.

Professors Edward I. Altman and Richard D. Gritta have developed a regression analysis to predict the ability of an airline to survive one to five years into the future based on debt load, profitability, and other factors. Table 28 shows their predictions made for airlines made between 1979 and 1982.

In 1982 nine airlines showed strong predictors of failure. Two of the largest, Brantiff and Continental, have gone bankrupt. Their pilots suffered. Continental pilots who struck receive ALPA union benefits. Those pilots who remained reportedly receive half of their former salaries.[33] Brantiff pilots began a self-owned airline whose survival is in doubt.[34]

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[32]Eastern airlines faced bankruptcy in February 1986. Pilots were agreeable to further wage concessions to protect their jobs.

[33]ALPA finances strike benefits by assessing remaining ALPA union pilots a monthly strike fee. These assessments are in addition to normal ALPA union dues. Unconfirmed reports from Continental pilots state that most pilots received less than half their wages and that these strike benefits ended in late 1985.

[34]Pilots who lose their jobs through airline bankruptcies or pilot lay-offs have some limited relief. The 1978 Deregulation Act provided limited protection for pilots who lost employment due to increased competition resulting from the Act. The Act stated that these pilots will be hired by airlines ahead of new pilot applicants but normally as junior pilots. However, as of late 1985, no pilot had won employment under this provision.

TABLE 28

AIRLINE BANKRUPTCY PROPENSITIES

Airline	1982	1981	1980	1979
Northwest	+7.46	5.59	5.16	4.81
Southwest	2.94	2.67	1.45	-0.31
US AIR	1.14	-0.06	-0.77	-0.16
Delta	0.57	2.78	4.87	4.30
Frontier	-0.14	1.31	0.46	-0.16
Ozark	-0.59	-0.97	-3.07	-3.36
Piedmont	-0.67	-0.70	-0.95	-2.33
UAL	-0.79	-0.77	-0.22	-0.57
TWA	-1.13	-1.07	-1.56	-1.88
American	-1.45	-1.42	-1.78	-0.67
PSA	-1.81	-1.67	-2.42	-1.55
Eastern	-2.55	-2.49	-2.21	-1.92
World	-2.60	-3.27	-2.86	-1.35
Republic	-2.76	-2.86	-2.01	-1.32
Western	-3.85	-3.57	-2.21	-0.68
Pan American	-4.17	-2.04	-1.00	-1.32
Continental	-4.17	-3.10	-4.37	-4.29
Hawaiian	-5.71	-3.82	-4.37	-4.29
Braniff	-15.42	-5.37	-3.60	-2.18

Source: Edward I. Altman and Richard D. Gritta, Airline Bankruptcy Propensities: A Zeta Analysis, Transportation Research Forum Vol 25, No. 1, 1984.

Note: Scores of less than -1.45 are considered indicative of bankruptcy. Scores greater than +0.87 indicate a strong financial position. Accuracy 90% one year prior to failure 70% 5 years prior.

Since pilot wages are shown to be highly correlated with the pilot's company seniority rather than with his experience, a change in employers generally will mean a large decrease in income. An experienced senior pilot from a bankrupt company will not be employed by another unionized company in a higher pilot position ahead of the pilots already employed; instead he will find himself at the bottom of the salary scale.

Deregulation has another negative affect on pilot pay. Major airlines lost part of their market share as new entrants flew former customers. As the major airlines'

market share decreased, fewer flights and pilots were required. This resulted in massive lay-offs of junior pilots. A lay-off will usually result in a severe interruption of earnings affecting total career income and financial security. Any airline may find itself facing severe market competition overnight. These negative affects on airline earnings will probably continue. Tables 29 and 30 list the number of pilots without work during 1983 and 1984. Approximately seven to fourteen percent of unionized pilots suffered some period of unemployment during this period.

TABLE 29

AIRLINES WITH FURLOUGHED PILOTS 1983 - 1984

Flying Tigers
Pan American
Republic
TWA
United
Western
National
Hawaiian
Wein
World

Source: FAPA

E. CONCLUSIONS

Airline deregulation eroded major airline profits. Decreased profits placed downward pressure on pilot wages. Airlines that suffer continued losses eventually must gain wage concessions or go bankrupt to compete in the new market. Only those airlines which have achieved profitability following airline deregulation may have the ability to maintain above average pilot wages.

With unregulated competition, increased efficiency tends to drive the cost of services down. This has occurred in

TABLE 30

AIRLINE PILOT ASSOCIATION
FURLOUGHED PILOTS 1983 - 1984

MONTH	Number on Lay-off
1983	
January	3,949
February	4,174
March	4,211
April	4,275
May	4,109
June	4,057
July	3,972
August	3,878
September	3,832
October	3,688
November	3,530
December	3,414
1984	
January	3,276
February	3,115
March	2,447
April	2,361
May	2,215
June	1,935
July	1,576
August	1,699
September	1,748
October	1,414
November	1,646
December	2,070

Source: Air Line Pilots Association

the United States. Since most airlines have similar costs for fuel and aircraft[35] and have little leeway to reduce these costs, wage reductions are the logical way for unprofitable airlines to compete.

As this thesis is being written, Eastern Airlines has been purchased by Texas Air. Faced by high debt and bankruptcy, Eastern had little choice but to sell. Eastern pilots, once among the highest paid, had made significant wage concessions to save their jobs. Texas Air, known as a

[35]Appendix G lists average fixed cost for flying a Boeing 747 for one hour in the United States.

low ticket price airline, will probably seek to lower pilot wages as it did at Continental Airlines in 1983. Eastern pilots can anticipate further wage reductions in addition to the twenty-two percent reductions already agreed to [Ref. 30: p. 32].

Texas Air, now owning Continental, Eastern, and New York Air will become the largest airline in the United States. Competition on most routes will increase, causing a decrease in ticket prices. This will place further pressure on Delta and other airlines to decrease their high pilot labor costs. Delta, hoping to prevent losses, has stated its desire to seek lower pilot wages similar to those paid by American [Ref. 31: p. 127].

Airlines often gain pilot wage reductions by reducing the wages of newly hired pilots. This protects senior pilot wages. In this case, new pilots at these two-tiered pays-cale airlines would never earn the salaries forecast in Chapter Four.

Airlines currently paying high pilot wages but in financial difficulty may not be the optimum choice for a new pilot seeking to maximize his career earnings, because career interruption will normally result in a permanent pay reduction.

VI. AIRLINE PILOT QUALIFICATIONS

A. INTRODUCTION

A prime assumption of this thesis is that a Navy pilot can be hired as a major airline pilot following his twenty years of military service. In the past this has not always been true. This section explains how recent developments in airline hiring practices make it true today.

During the 1970's the supply of skilled pilots exceeded demand. Pilot unions kept wages high through skillful bargaining. High wages increased the supply of qualified pilots.[36] Airlines used extensive screening policies to hire only the most qualified pilots. For economic reasons, airlines increased minimum pilot requirements, effectively eliminating older military pilots from new pilot jobs. Because airline pilots require training and certification on each airliner they fly, regardless of past experience, pilots' training costs, borne by the airlines, are high. Pilot training cost, on average, $ 10,000 [Ref. 32]. Airlines recoup training costs during a pilot's productive career. The younger a pilot when hired the longer his potential airline career. Economically, airlines attempted to hire younger qualified pilots since their training costs may be recovered over more productive years. Investing in pilot training for an older pilot was not financially sound when younger pilots were available. Navy pilots discovered that they needed to joined an airline soon after their initial military service obligation, about age thirty, or they would be too old.

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[36]During the Vietnam era, the military trained thousands of pilots; however most of these pilots were not hired by the airlines.

Airlines also realize that the military is a ready source of highly trained pilots. The military provides intensive pilot training and experience in multi-crewed aircraft. Military flying often simulates airline pilot duties. Civilian pilots on average lack the marketable skills of formal flight training and experience in airline type aircraft. Airlines could realize lower training costs and lower pilot loss rates by hiring military pilots. Pilots with military training came to dominate the industry. At present over half of all new airline pilots are ex-military pilots.

Since pilot supply exceeded demand, new airline pilot requirements were stringent. Many were called but few were chosen.[37] From the 1970's to early 1980's, pilots were required to meet the following qualifications:

1. Age usually less than thirty-two.
2. 20/20 uncorrected eyesight.
3. 2,500 total flight hours, preferably in jet or turbo-prop aircraft.
4. A college degree.
5. Successful completion of the flight engineers written exam.

B. CURRENT QUALIFICATIONS

Airline deregulation has increased the demand for pilots. Over 7,000 new pilots were hired in 1985 [Ref. 33]. New airlines entering the market, such as People Express, hired hundreds of pilots, decreasing excess supply. However as airline expansion increased new pilot demand during the late 1970's and early 1980's the number of new military and civilian pilots decreased. An economic recession decreased the number of new civilian pilots who, in a weak economy, lacked the funds to pay for their training. Traditionally,

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[37]Pilot interview to hire ratios ranged from 20:1 to 7:1.

they had been able to increase their pilot qualifications by flying for small companies or by instructing flight students. But during the recession these opportunities disappeared. also, in 1974, after the U.S. military period in Vietnam had diminished significantly, the military had reduced the number of new pilots they trained. This greatly reduced the number of military pilots available after 1980.[38]

As pilot demand exceeded pilot supply, minimum hiring qualifications for new pilots decreased. Most important for military pilots is that airlines are now hiring older pilots. Personnel managers interviewed off the record attribute this change to the following:

1. The threat posed by age discrimination cases in the airline and other industries.
2. A shortage of trained pilots relative to demand.
3. The desire to obtain highly trained military pilots.
4. The ability of retired pilots to absorb pay cuts due to the supplement of military retirement funds.
5. The ability of a military pilot to "fit in" with other crew members.

Only reasons one and two are legitimate explanations for airlines' policies of hiring older pilots. Although reasons three through five were given, they cannot explain the change because these factors have existed in the past. Table 31 and Table 32 lists the current range of qualifications of newly hired airline pilots in 1984 for major and national airlines.

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[38]The obligated service for pilot training was 4.5 years vs. 5 years today.

C. CONCLUSIONS

Airline deregulation has increased the demand for highly-trained pilots. Military pilots are desired by airlines. Since the demand for pilots has increased relative to supply the minimum hiring standards of major airlines have decreased.

Personnel managers stressed that when choosing pilots they expect an older pilot to have more flight experience than a younger competitor. A retired military pilot will be expected to have recent flight experience and more flight hours than a younger pilot to be competitive. This means that officers not recently piloting aircraft or with low flight hours may not be competitive for major airline pilot positions.

No pilot is guaranteed airline employment. However, evidence suggests that a retired military pilot with good flight experience will be very competitive for available pilot positions. Tables 31 and 32 show pilots up to ages forty-four and fifty-six hired by the major and national airlines in 1984.[39]

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[39]Appendix F list military pilots up to age fifty-five hired in 1984.

TABLE 31

1984 MAJOR AIRLINE SUMMARY OF
NEW PILOT QUALIFICATIONS

MAJOR AIRLINES

Total pilots hired in 1984	1088
% of pilots surveyed	41.08 %
Pilot Experience	
Multi-engine rating	89.04 %
Accumulated flight hours	785-9990 hours
Median flight hours	3991.94
Military flying only	39.15%
Military and Civilian flying	16.11%
Total % military hires	55.26%
Medical requirements	
Age Range	22-44.7 years
Median	29.35 years
Lowest vision required	20/70

Source: Piloting Careers, February, 1985.

TABLE 32

1984 NATIONAL AIRLINE SUMMARY OF NEW PILOT QUALIFICATIONS

Total pilots hired in 1984	1513
% of pilots surveyed	23.53
Pilot background	
Multi-engine rating	95.79%
flight time range (hours)	1,650-20,038
Median hours	4998.34
Military flying only	26.12%
Military and Civilian	26.12%
Total % military hires	52.24%
Medical requirements	
Age Range	22-56.08 years
Median	34.02 years
Lowest vision required	20/100

Source: Piloting Careers, February, 1985.

TABLE 33

MAJOR AIRLINE MINIMUM PILOT QUALIFICATIONS FOR 1985

Airline	Date	New Minimums
American	Dec 1984	Commercial + Instrument ratings 700 hours multi-engine or jet High School Graduate Second Class Medical
United	Dec 1984	Commercial + Instrument ratings 1000 hours total time High School Graduate 20/70 vision Second Class Medical
Eastern	Feb 1985	1200 total hours; 500 turbine, 200 pilot in command College Graduate 20/20 vision
Northwest	March 1985	2,000 total time Commercial, multi-engine and instrument ratings College Graduate Flight Engineers written exam

Source: Piloting Careers, February, 1985.

VII. EARNINGS COMPARISONS

A. INTRODUCTION

Prior chapters developed average career earnings for airline and Navy pilots. Navy pilots could receive three distinct salary supplements; ACIP (flight pay) only, ACIP and installment AOCP, or ACIP and a lump-sum AOCP. Salaries were computed including and excluding tax benefits derived from military tax-free income.

This chapter compares career earnings and retirement benefits from age thirty to: age forty-two when the Navy pilot may retire and join an airline; sixty when most pilots retire, and age 77.6.[40] It is assumed that the retired Navy pilot will fly for a major airline receiving the average airline salary developed in Chapter Four.

B. AVERAGE AGE MILITARY PILOTS ARE HIRED BY AIRLINES

Since the career-span of an airline pilot is limited, it is critical to determine the average age ex-military pilots are hired by the major airlines. This allows total airline wages for a pilot's remaining working years to be computed.

Most Navy officers begin pilot training following college at age twenty-two. Flight training takes between eighteen and twenty-four months. The new pilot assumes a five-year military obligation at the end of training. Therefore the earliest a pilot may usually resign is age twenty-nine, seven years after the start of pilot training.

Few airlines will begin hiring a military pilot until he has been discharged. From discharge to the beginning of airline training classes[41] may take a few months to years.

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[40] Sixty is the mandatory retirement age for airline pilots. The average life expectancy of a Navy Officer is 77.6, which ends retirement income.

[41] Training class dates determine a pilot's seniority

To determine the average age ex-military pilots are hired by the major airlines, I averaged the ages of recent newly hired pilots who had military training. FAPA surveys new airline pilots reporting the individual's age and military experience. Appendix F contains the ages at which ex-military pilots were hired during 1984 and 1985. To eliminate the skewing of the average age by including retired pilots in the data set, I eliminated all officers over age thirty-eight from the sample.[42] The most common age (mode) was thirty and the average age was about thirty-two. Figure 7.1 shows that most military pilots who join the airlines do so soon after the end of their service obligation. Following two years of pilot training and a five year obligation most pilots will be age thirty as shown in Figure 7.1 . Age thirty, will be used in this study. Using age thirty is most relevant because it the lowest age at which most pilots make an economic decision to join an airline vs. continue a Navy career.

C. COMPARISON OF PILOT EARNINGS TO MILITARY RETIREMENT AGE FORTY-TWO

This section compares airline pilot earnings to the income of a Navy pilot who completes twenty years of military service. Wages are for a married officer. Three Navy salaries from Chapter Two are possible:

1. Pilot receives ACIP but no AOCP 'Bonus' payment.
2. Pilot receives one $ 6,000 AOCP 'Bonus' each year for six years.
3. Pilot receives one $ 36,000 lump-sum AOCP 'Bonus' payment.

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date for bidding purposes.

[42]Age thirty-eight was conservatively selected since an officer may have joined the Navy at age eighteen, gained promotion to commissioned officer and became a pilot. This pilot could retire at age thirty-nine following twenty years of military service.

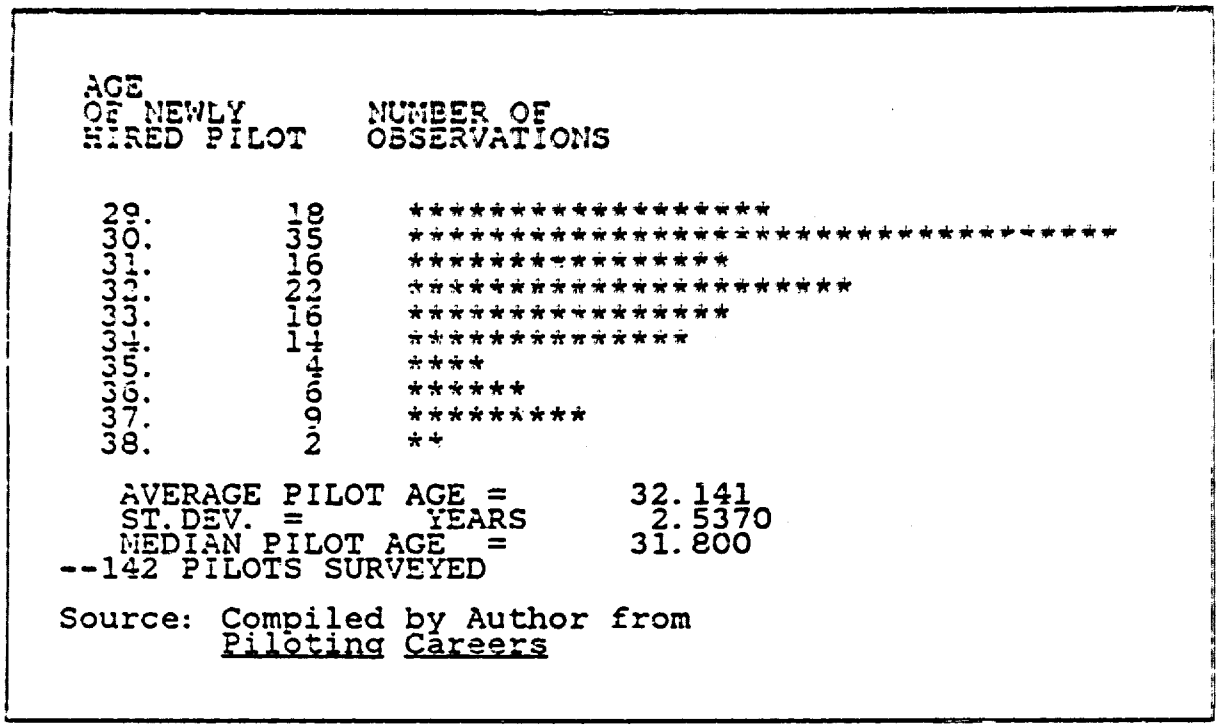

Figure 7.1 Age Histogram Of
Newly Hired Ex-Military Pilots 1984-1985.

The computed yearly wages are displayed in three groupings. Navy earnings are compared to the average airline earnings calculated in Chapter Four and displayed in Table 34 . A real discount rate of five percent is used to calculate the present value of the total earnings to the pilot at age thirty.

1. Navy Pilot Receiving ACIP Only

The yearly salaries of a Navy and an airline pilot are displayed in Tables 35 and 36 . These Navy pilots do not receive the additional $ 36,000 AOCP payment but their incomes still surpass airline pilot earnings. In undiscounted dollars a Navy pilot earns $ 627,987.90 while the airline pilot earns $ 524,432.00. A Navy pilot surpasses total airline earnings by $ 103,555.90 or twenty percent during the twelve years prior to military retirement. Since Navy salaries far exceed airline earnings during the early

TABLE 34

AVERAGE AIRLINE PILOT EARNINGS
AGE THIRTY TO FORTY-TWO

Age	Gross Yearly Earnings AIRLINE[1]	NAVY[2]
30	$ 15,147	$ 49,161
31	28,305	49,161
32	31,028	54,030
33	34,053	54,030
34	37,411	55,832
35	41,140	55,832
36	45,280	52,294
37	49,878	52,294
38	54,984	58,095
39	60,654	58,095
40	62,386	60,055
41	64,166	60,055

Source: Author
Note 1. 1986 Dollars, 29,075 pilot sample size.
Note 2. Navy pay for officer with four dependents, receiving installment AOCP and tax benefits.

years, the Navy's present value of earnings of $ 478,772 exceeds the airline's $ 384,041 by twenty-five percent.

2. Navy Pilot Receiving ACIP and Installment AOCP

Table 37 shows the yearly salaries of Navy pilots receiving six $ 6,000 installment AOCP payments. Table 38 has the present value of these salaries. Navy earnings exceed total airline earnings by $ 134,503 or 26 percent undiscounted, and by $ 122,238 or 32 percent, discounted.

3. Navy Pilot Receiving ACIP and Lump-Sum AOCP

These pilots have the highest present value earnings of the three groups since the entire $ 36,000 bonus is received in the first year. Table 39 displays constant dollar comparisons while Table 40 has the present values of Table 39 . The present value of the Navy pilot's $ 509,877 exceeds the airline pilot's income of $ 384,041 by $ 125,385, or thirty-three percent.

4. Summary

In short, a Navy pilot will maximize his earnings by remaining in the Navy until retirement. Total Navy earnings exceed those of the average airline pilot during the twelve years both fly before the Navy pilot's retirement. Airline yearly earnings surpass Navy earnings between age thirty-nine and forty. Total Navy earnings in undiscounted dollars exceed airline earnings by $ 62,573 to $ 132,792, or from twelve to twenty-five percent. Navy earnings in present value dollars exceed airline earnings by $ 63,026 to $ 125,835, or from sixteen to thirty-three percent. Tables 41 and 42 display a summary of the difference in total pay received in constant and present dollars.

D. COMPARISON OF INCOMES TO AGE SIXTY - AIRLINE RETIREMENT

1. Introduction

This section compares total incomes to final pilot retirement at age sixty. Two important factors affect total pay received: the higher yearly earnings of the more senior of the airline pilots and the Navy pilot's military retirement income of $ 21,094 yearly.[43]

The six Navy salaries from age thirty to forty-two are carried over to begin these comparisons. Tables 43 and 44 display a summary of total pilot pay received in undiscounted and present value dollars to age sixty.

2. Summary

All Navy pilots' incomes exceed total airline present value earnings by at least $ 11,196 or one percent. Those pilots receiving the $ 36,000 AOCP bonus have incomes that exceed airline earnings by $ 42,301 or four percent. In undiscounted dollars, over a thirty year career the

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[43]Remember that the Navy pilot may retire following twenty years of military service. He may then fly for an airline while receiving $ 21,094 in retirement pay yearly. His total yearly income will be airline pay plus military retirement pay.

airline pilot's income surpasses Navy income by from $ 130,667 to $ 61,241 depending on the bonus received and on the inclusion or exclusion of military tax advantages. However, undiscounted dollars are not the appropriate method of comparison. The present value totals for the Navy pilot exceed the airline pilot's due to two factors:[44]

1. Navy wages exceed airline wages for the first nine to ten years of their careers.
2. Navy pilots who reach retirement each receive pension benefits of $ 21,094 yearly starting at age forty-two.

But economic life does not end at retirement. The next section examines the effect of the combination of airline and military retirement on a career Navy pilot's lifetime earnings.

E. COMPARISON OF LIFE-TIME EARNINGS TO AGE SEVENTY-EIGHT

1. Introduction

Since pilots must retire at age sixty,[45] the differences in retirement incomes of the pilots will determine the difference in total lifetime incomes from age sixty to death. A Navy officer has been found to live longer than his civilian male counter-part. A 45 year-old Navy officer can expect to live another 32.6 years to age 77.6 years, five years longer than his civilian counter-part [Ref. 34: p. 33]. For this study, I assume that airline pilots will also live this long. Investment, business, and Social Security incomes are not included in this study.[46] While a

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[44]Navy pilot's incomes are increased by the receipt of $ 379,692 in military retirement pay during this period which offsets the higher earnings of the more senior airline pilot.

[45]Recent court decisions allow captains to downgrade to third-pilot (flight engineer) at age sixty. Evidence suggests that most most retire rather than taking a pay decrease to work.

[46]Both are eligible to receive maximum Social Security incomes, negating any income differential from Social Security. Present legal initiatives to tax Social Security benefits in the future for high-income individuals make income from Social Security for a retired pilot less certain. No information is available on individual pilot

retired pilot may work following age sixty in another business, this study will assume income from military and retirement sources as the pilot's only source of income.

Military retirement income is one-half of the officer's final base salary. Retired Commander's pay is $ 21,094 per year in 1986. Military retirement benefits may be reduced in the future. However it is likely that all current service members will be grandfathered and continue to receive current benefits [Ref. 35].

2. Airline Retirement Benefits

Airline retirement benefits are difficult to estimate accurately. Not all airlines offer retirement benefits. Those that do usually calculate pay as a percentage of a pilot's last three years of airline pay. These percentages vary from thirty to sixty percent. Table 45 lists current major and national airline pension plans.

Thirteen major airlines offer pension benefits. Airline pilots interviewed state that the determination of pensions is complex and unique for each pilot. Average pensions for major airline pilots were calculated by using a weighted-average of each airline's estimated pension benefits based on the following assumptions:

1. The pilot will receive the average final salary computed in Chapter Four and displayed in Tables 46 and 47 .
2. Pay is calculated for the final working year using seniority of twenty-nine or eighteen years.
3. Pilots will receive the average pension amount for each airline where a minimum and maximum amount are listed in Tables 46 and 47 .

To obtain an average airline pension, each company's pension is weighted by the chance each pilot has of being employed by that airline. This calculation is identical to the process which calculated the average airline pilot wage from each individual company's calculated pay scale in

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investment or business income.

Chapter Four. Pilot percentages are displayed again in Table 48 for reference.

The result of this study is that a pilot who joins an airline at age thirty will receive an average yearly pension of $ 52,124. A retired military pilot reaching eighteen years of airline seniority will receive an average airline pension of $ 37,691. Combining the airline and military pensions, the career Navy pilot will receive a yearly total of $ 58,785 - about $ 6,661 more than an airline-only career.

F. CONCLUSIONS

A Navy officer who retires and lives to the average age of 77.6 years will receive $ 780,748 1986 dollars in military retirement pay. Combined with an airline pension of $ 716,090 a total of $ 1,496,607 dollars is received in retirement funds. His civilian counter-part who joined the airlines at age thirty receives a total pension income of $ 990,356, or one-half million dollars less. Since undiscounted dollar total incomes at age sixty were close, this large difference in retirement incomes affects the total earnings between a military or airline career. Tables 49 and 50 present the sum of life-time incomes including retirement income in undiscounted and present value 1986 dollars.

All Navy pilots' incomes(present values) exceed airline incomes by three to six percent. Undiscounted dollar incomes are similar, with Navy incomes exceeding airline incomes by a maximum of two percent. Career decisions made earlier in life should include the future retirement value of the career choice in addition to the immediate monetary pay of a career. A pilot choosing a military career will receive a discounted income that matches or exceeds the income for a pilot choosing an airline career.

How crucial was the choice of a five percent discount rate to this comparison? Various discount rates above five percent were tried. The result was an even greater gain in the present value of pay for those pilots who chose to stay in the Navy. The reason is clear. Higher discount rates give greater weight to short-term differences in pay, and in the short-term, Navy pay exceeds airline pay. If airline wages continue to decrease, while Navy pay remains constant or increases, the comparison will shift further towards a Navy career.

TABLE 35

UNDISCOUNTED DOLLAR COMPARISON OF EARNINGS
(NAVY PILOT RECEIVES ACIP ONLY)

GROSS ANNUAL EARNINGS

YEARS OF COMPLETED SERVICE	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
8 YOS	$ 41,566.92	$ 43,949.93	$ 15,147
9 YOS	41,566.92	43,949.93	28,305
10 YOS	45,843.48	48,878.48	31,028
11 YOS	45,843.48	48,878.48	34,053
12 YOS	47,578.68	50,721.68	37,411
13 YOS	47,578.68	50,721.68	41,140
14 YOS	49,061.88	52,293.88	45,280
15 YOS	49,061.88	52.293.88	49,878
16 YOS	54,419.64	58,094.64	54,984
17 YOS	54,419.64	58,094.64	60,654
18 YOS	56,284.44	60,055.36	62,386
19 YOS	56,284.44	60,055.36	64,166
TOTAL	$ 589,510.00	$ 627,987.90	$ 524,432

Source: Computed by author from Appendix A
Note: Salaries for officer receiving with-dependent BAQ.

TABLE 36

PRESENT VALUE COMPARISON OF EARNINGS
(NAVY PILOT RECEIVES ACIP ONLY)

GROSS ANNUAL EARNINGS

YEARS OF COMPLETED SERVICE	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
8 YOS	$ 41,566.92	$ 43,949.93	$ 15,147.00
9 YOS	39,587.54	41,857.06	26,957.14
10 YOS	41,581.38	44,344.22	28,143.31
11 YOS	39,601.32	42,223.06	29,416.26
12 YOS	39,143.09	41,728.85	30,778.12
13 YOS	37,279.14	39,741.76	32,234.26
14 YOS	36,610.73	39,022.49	33,788.63
15 YOS	34,867.36	37,164.28	35,447.36
16 YOS	36,833.35	39,320.73	37,215.33
17 YOS	35,079.38	37,448.32	39,098.10
18 YOS	34,553.76	36,868.78	38,299.59
19 YOS	32,908.34	35,113.12	37,516.53
TOTAL	$ 449,612.30	$ 478,772.60	$ 384,041.60

Source: Computed by author from Appendix A

TABLE 37

UNDISCOUNTED DOLLAR COMPARISON OF EARNINGS
(NAVY PILOT RECEIVES INSTALLMENT AOCP)

GROSS ANNUAL EARNINGS

YEARS OF COMPLETED SERVICE	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
8 YOS	$ 46,438.92	$ 49,160.92	$ 15,147
9 YOS	46,438.92	49,160.92	28,305
10 YOS	50,715.48	54,030.48	31,028
11 YOS	50,715.48	54,030.48	34,053
12 YOS	52,450.68	55,832.68	37,411
13 YOS	52,450.68	55,832.68	41,140
14 YOS	49,061.88	52,293.88	45,280
15 YOS	49,061.84	52,293.88	49,878
16 YOS	54,419.64	58,094.64	54,984
17 YOS	54,419.64	58,094.64	60,654
18 YOS	56,284.44	60,055.36	62,386
19 YOS	56,284.44	60,055.36	64,166
TOTAL	$ 618,742.00	$ 658,935.90	$ 524,432.00

Source: Computed by author from Appendix A

TABLE 38

PRESENT VALUE COMPARISON OF EARNINGS
(NAVY PILOT RECEIVES INSTALLMENT ACCP)

GROSS ANNUAL EARNINGS

YEARS OF COMPLETED SERVICE	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
8 YOS	$ 46,438.92	$ 49,160.92	$ 15,147.00
9 YOS	46,428.45	46,819.92	26,987.14
10 YOS	46,000.43	49,007.23	28,143.31
11 YOS	43,809.93	46,673.56	29,416.26
12 YOS	43,151.30	45,933.68	30,788.12
13 YOS	41,096.48	43,746.36	32,234.26
14 YOS	36,610.73	39,022.49	33,788.63
15 YOS	36,761.29	37,164.28	35,447.36
16 YOS	36,833.35	39,320.73	37,215.33
17 YOS	35,079.38	37,448.32	39,098.10
18 YOS	34,553.76	36,868.78	38,299.59
19 YOS	32,908.34	35,113.12	37,516.53
TOTAL	$ 475,577.50	$ 506,279.40	$ 384,041.60

Source: Computed by author from Appendix A

TABLE 39

UNDISCOUNTED DOLLAR COMPARISON OF EARNINGS
(NAVY PILOT RECEIVES LUMP-SUM AOCP)

GROSS ANNUAL EARNINGS

YEARS OF COMPLETED SERVICE	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
8 YOS	$ 76,438.92	$ 80,174.96	$ 15,147
9 YOS	40,438.92	42,786.92	28,305
10 YOS	44,715.48	47,675.48	31,028
11 YOS	44,715.48	47,675.48	34,053
12 YOS	46,450.68	49,549.68	37,411
13 YOS	46,450.68	49,549.68	41,140
14 YOS	49,061.88	52,293.88	45,280
15 YOS	49,061.88	55,293.84	49,878
16 YOS	54,419.64	58,094.64	54,984
17 YOS	54,419.64	58,094.64	60,654
18 YOS	56,284.44	60,055.36	62,386
19 YOS	56,284.44	60,055.36	64,166
TOTAL	$ 618,742.00	$ 658,299.90	$ 524,432

Source: Computed by author from Appendix A

TABLE 40

PRESENT VALUE COMPARISON OF EARNINGS
(NAVY PILOT RECEIVES LUMP-SUM AOCP)

GROSS ANNUAL EARNINGS

YEARS OF COMPLETED SERVICE	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
8 YOS	$ 76,438.92	$ 80,174.96	$ 15,147.00
9 YOS	38,513.25	40,749.44	26,957.14
10 YOS	40,588.25	43,243.06	28,143.31
11 YOS	38,626.91	41,183.87	29,416.26
12 YOS	38,215.08	40,764.64	30,778.12
13 YOS	36,395.32	38,823.47	32,234.26
14 YOS	36,610.73	39,022.49	33,788.63
15 YOS	34,867.36	37,164.28	35,447.36
16 YOS	36,833.35	39,320.73	37,215.33
17 YOS	35,079.38	37,448.32	39,098.10
18 YOS	34,553.76	36,868.78	38,299.59
19 YOS	32,908.34	35,113.12	37,516.53
TOTAL	$ 479,600.70	$ 509,877.20	$ 384,041.60

Source: Computed by author from Appendix A

TABLE 41

UNDISCOUNTED DOLLAR SUMMARY OF EARNINGS
AGE THIRTY TO FORTY-TWO

GROSS ANNUAL EARNINGS

NAVY PAYS RECEIVED	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
ACIP	$ 589,510.00	$ 627,987.90	$ 524,432.00
INSTALLMENT AOCP	$ 618,742.00	$ 658,935.90	$ 524,432.00
LUMP-SUM AOCP	$ 618,742.00	$ 658,299.90	$ 524,432.00

Source: Author
Note: Lump-Sum total pay with tax benefits slightly less than installment AOCP due to differences in tax savings.

TABLE 42

PRESENT VALUE SUMMARY OF EARNINGS
AGE THIRTY TO FORTY-TWO

GROSS ANNUAL EARNINGS

NAVY PAYS RECEIVED	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
ACIP	$ 449,612.30	$ 478,772.60	$ 384,041.60
INSTALLMENT AOCP	$ 475,577.50	$ 506,279.40	$ 384,041.60
LUMP-SUM AOCP	$ 479,600.70	$ 509,877.20	$ 384,041.60

Source: Author

TABLE 43

TOTAL CAREER INCOMES IN UNDISCOUNTED DOLLARS
AGE THIRTY TO SIXTY

TOTAL INCOMES

NAVY PAYS RECEIVED	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
ACIP	$ 1,918,972	$ 1,957,450	$ 2,049,639
INSTALLMENT AOCP	$ 1,948,202	$ 1,988,398	$ 2,049,639
LUMP-SUM AOCP	$ 1,948,202	$ 1,987,762	$ 2,049,639

Source: Author
Note: Lump-Sum total pay with tax benefits less than installment AOCP due to differences in tax savings.

TABLE 44

PRESENT VALUE OF CAREER INCOMES
AGE THIRTY TO SIXTY

TOTAL INCOMES

NAVY PAYS RECEIVED	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
ACIP	$ 924,308	$ 953,468	$ 942,272
INSTALLMENT AOCP	$ 950,273	$ 980,976	$ 942,272
LUMP-SUM AOCP	$ 954,295	$ 984,573	$ 942,272

Source: Author

TABLE 45

AIRLINE PENSION PLANS

Pension Plans 1984-1985

Majors Airlines		National Airlines	
American	60%	Airborne	Yes
Continental	None	Air Cal	Yes
Delta	60%	Alaska	Yes
Eastern	60%	Aloha	Yes
Flying Tigers	Note 1	Empire	None
Northwest	Note 1	Frontier	Yes
Pan AM	Note 1	Hawaiian	Yes
Piedmont	Yes	Midway	None
Republic	Note 1	Midway Express	Not Avail.
TWA	Note 1	New York Air	24%
United	Note 1	Ozark	Yes
USAir	Note 1	Peoples Express	None
Western	Note 1	PSA	Yes
		Southwest	Yes
		Trans Am	Yes
		Wien	Yes
		World	Yes

Source: FAPA
Note 1: retirement pay is a variable and a function of averaged last years of service: 30 % to 60 %.

TABLE 46

FINAL AIRLINE WAGE AND PENSION BENEFITS
FOR PILOT HIRED AT AGE THIRTY

AIRLINE	YEAR OF SERVICE 29	Pension (Estimate)
American	$ 65,000	$ 39,000
Continental	50,004	0
Delta	135,205	81,123
Eastern	83,513	50,107
Flying Tigers	137,767	41,330 - 82,660
Northwest	158,911	47,697 - 95,394
Pan AM	105,389	31,616 - 63,233
Piedmont	116,110	34,833 - 69,666
Republic	95,605	28,681 - 57,363
TWA	105,599	31,679 - 63,359
United	126,456	37,937 - 75,874
USAir	136,825	41,047 - 82,095
Western	69,440	20,832 - 41,664

Source: Author
Note: Range of pension estimates calculated by multiplying the average final wage by thirty or sixty percent.

TABLE 47

FINAL AIRLINE WAGE AND PENSION BENEFITS
FOR PILOT HIRED AT AGE FORTY-TWO

AIRLINE	YEAR OF SERVICE 18	Pension (Estimate)
American	$ 65,000	$ 39,000
Continental	50,004	0
Delta	103,452	62,071
Eastern	66,992	30,064
Flying Tigers	101,987	30,596 - 61,192
Northwest	107,286	32,186 - 64,372
Pan AM	77,653	23,296 - 46,592
Piedmont [1]	89,399	26,820 - 53,639
Republic	78,848	23,654 - 47,308
TWA	70,996	21,299 - 42,598
United	78,847	23,654 - 47,308
USAir	101,772	30,532 - 61,063
Western	48,516	14,555 - 29,110

Source: Author
Note: Range of pension estimates calculated by multiplying the average final wage by thirty or sixty percent.

TABLE 48

PILOTS EMPLOYED BY THE MAJOR AIRLINES
AS A PERCENTAGE OF TOTAL PILOTS EMPLOYED

AIRLINE	# AIRCRAFT	# Pilots	Airline Percent of Total Pilots
American	237	3,437	.118
Continental	90	1,400	.048
Delta	227	3,773	.130
Eastern	278	3,475	.119
Flying Tigers	31	682	.023
Northwest	109	1,698	.058
Pan AM	126	1,627	.056
Piedmont	88	19	.032
Republic	163	1,616	.056
TWA	156	2,791	.096
United	316	4,934	.170
USAir	124	1,462	.050
Western	73	1,261	.043
	TOTAL:	29,075	1.000

Source: ALPA and World Aviation Directory.

TABLE 49

UNDISCOUNTED 1986 DOLLAR LIFETIME INCOMES
AGE THIRTY TO SEVENTY-EIGHT

TOTAL INCOMES

NAVY PAYS RECEIVED	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
ACIP	$ 2,953,588	$ 2,992,066	$ 2,967,051
INSTALLMENT AOCP	$ 2,982,820	$ 3,023,014	$ 2,967,051
LUMP-SUM AOCP	$ 2,982,820	$ 3,022,917	$ 2,967,051

Source: Author
Note: Lump-Sum total pay with tax benefits slightly less than installment AOCP due to differences in tax savings.

TABLE 50

TOTAL 1986 PRESENT VALUE LIFETIME INCOMES
AGE THIRTY TO SEVENTY-EIGHT

TOTAL INCOMES

NAVY PAYS RECEIVED	NAVY SUM OF PAYS ALLOWANCES AND INCENTIVE PAYS	NAVY TOTAL WITH FEDERAL TAX ADVANTAGES	AVERAGE AIRLINE SALARY
ACIP	$ 1,088,881	$ 1,118,041	$ 1,088,199
INSTALLMENT AOCP	$ 1,114,846	$ 1,145,548	$ 1,088,199
LUMP-SUM AOCP	$ 1,118,869	$ 1,149,684	$ 1,088,199

Source: Author

VIII. THE FUTURE OF PILOT PAY IN THE UNITED STATES

"Airline executives argue that the equilibrium for a top pilot pay could be as low as $65,000 in current dollars, 42 % below average pay for ALPA members." [Ref. 36: p. 127]

This prediction, made in 1984, is approaching reality today. Chapter Four pointed out that locals of the Air Line Pilots Association (ALPA) have accepted wage deferrals or reductions forty-five times since 1980 [Ref. 37: p. 127]. Also, only the pilots of one airline, Northwest, have received a pay increase. Airline deregulation removed the protection from competition that had allowed airlines to keep prices and wages high.

Economists believe that organizations (airlines) in a market that becomes competitive will become increasingly efficient. As efficiency increases, competitors will decrease the price of their goods and services (ticket price) to increase their market share and profits. Airlines will eventually be forced, through competition, to sell similar airline seats for lower prices. All airlines whose costs exceed the ticket price will lose money on each passenger. Airlines will be forced to become more efficient to compete and survive. Labor costs will be reduced toward the level reached by the most efficient airline.

We are seeing this process at work, today, in the United States. Airlines are changing their route structures, maximizing the use of their aircraft and cutting unnecessary costs while still providing excellent transportation at lower prices.

New airlines that enter with much lower labor costs, such as People Express, have a competitive advantage. Appendix G shows the average cost of operating a B-747, for

one flight hour, including the cost of the flight crew. A large part of airline expenses are fixed. Fuel aircraft, and taxes cost about the same for all well run airlines. If ticket prices decrease through competition, labor costs are one area to reduce for an airline to remain competitive. An airline paying a captain $ 130,000 plus per year to do the same job as an airline paying a captain $ 50,000 is clearly at a competitive disadvantage.

An alternative for an employee wage reduction is for employees to increase productivity. Pilot productivity has improved. Pilots fly more passengers on the jumbo aircraft, increasing productivity by three hundred percent. New aircraft often require two instead of three pilots increasing productivity by a third. Pilots could fly more hours per month; however, for reasons of safety, some upper limit will probably remain.

Competition also acts to raise the cost of labor. New airlines have paid their pilots substantially lower wages then the major airlines. As the national airlines increase in size, they will begin to compete for the shrinking pool of available pilots, hence driving up the minimum cost of pilot labor. In an efficient market, we can expect to see some stabilization of pilot wages somewhere between the high wages of the major airlines and the lower wages of the nationals.

Some experts predict a top future pilot wage of $ 65,000. If true, how will this fact affect the comparison of earnings between Navy and airline pilots? Giving some advantage to the airlines, let us assume that the top wage will be not $ 65,000 but $ 70,000. Further, let us assume that the current wages of major airlines will suffer no further reductions and the present temporary pay reductions between years one and five will be restored.

For reference, the average pilot wages developed in Chapter Four are displayed in Table 51 . Table 52 displays the same salaries with a $ 70,000 wage cap.

TABLE 51

THIRTY YEAR FORECAST OF AIRLINE PILOT AVERAGE YEARLY EARNINGS

Gross Yearly Earnings In 1986 Dollars

YOS		YOS	
1	$ 15,147	16	$ 71,813
2	28,305	17	73,863
3	31,028	18	75,972
4	34,053	19	78,142
5	37,411	20	80,371
6	41,140	21	82,666
7	45,280	22	85,025
8	49,878	23	87,453
9	54,984	24	89,949
10	60,654	25	92,518
11	62,386	26	95,159
12	64,166	27	97,875
13	65,988	28	100,669
14	67,882	29	103,543
15	69,820	30	106,499

Source: Author
Note 1. 1986 Dollars.
2. Computed from age thirty to sixty.

With reduced wages, retirement benefits will be lower. For this study we will assume that a career airline pilot with thirty years of service will receive forty-five percent of his final pay or $ 31,500 per year. His counter-part

TABLE 52

THIRTY YEAR FUTURE FORECAST OF AIRLINE PILOT AVERAGE YEARLY EARNINGS

Gross Yearly Earnings In 1986 Dollars

YOS		YOS	
1	$ 15,147	16	$ 70,000
2	28,305	17	70,000
3	31,028	18	70,000
4	34,053	19	70,000
5	37,411	20	70,000
6	41,140	21	70,000
7	45,280	22	70,000
8	49,878	23	70,000
9	54,984	24	70,000
10	60,654	25	70,000
11	62,386	26	70,000
12	64,166	27	70,000
13	65,988	28	70,000
14	67,882	29	70,000
15	69,820	30	70,000

Source: Author
Note 1. 1986 Dollars.
2. Computed from age thirty to sixty.

with eighteen years with the airlines will also receive the maximum pilot pay of $ 70,000 but receive only $ 21,000 per year, about thirty percent of his final salary.

The total retirement pay of the two pilots are quite different. Over a lifetime the Navy pilot will receive $ 1,120,546 while the airline pilot receives only $ 554,400, fifty percent less.

Comparing the total lifetime incomes of the two, and using the Navy pilot receiving the lump-sum bonus, the Navy pilot receives $ 2,717,604 with a present value of $ 1,095,898, compared to the airline pilot's $ 2,332,522 and $ 947,206 respectfully.
The Navy career exceeds airline career earnings by sixteen percent in undiscounted and present value dollars.

Even if we assume that Navy pilots of the future will not receive any AOCP payments, the differences continue to support a military career. Comparing the total lifetime incomes of the two, and using the Navy pilot receiving ACIP only, the Navy pilot receives $ 2,686,656 with a present value of $ 1,068,391, compared to the airline pilot's $ 2,332,522 and $ 947,206 respectfully. The Navy career income exceeds airline career income by fifteen percent in undiscounted, and thirteen percent in present value dollars.

The result is that as the maximum airline pay decreases, the advantage of a Navy career increases. The results of the last chapter showed the present value of a Navy pilot's lifetime income exceeding airline career income by from three to six percent. Undiscounted dollar incomes were roughly equal with Navy income exceeding airline income by a maximum of two percent. If maximum airline pay decreases to $ 70,000, incomes will shift substantially in favor of a Navy career.

IX. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The lifetime earnings of Navy pilots who retire prior to beginning airline pilot careers exceed those of Navy pilots who begin airline careers before reaching retirement, in both undiscounted and present value dollars However, Navy pilots do not seem aware of this. Most believe they are financially better off taking airline jobs before reaching retirement. One reason for this mistaken belief is that they underestimate their individual military pay. Evidence suggests they compare net military to maximum gross airline pay when making a career decision.

The pay of an average major airline pilot does not exceed the pay of a Navy pilot until he has between nine and ten years of airline seniority. Airline deregulation has placed downward pressure on pilots' wages through increased pricing competition between airlines. Since 1983, only one airline has increased pilot wages. Industry experts predict pilot wages will work towards an industrial norm of $ 65,000 for senior captains.

As airline wages decrease, the economic value of remaining in the Navy increases. Navy pilots remaining will benefit from the $ 36,000 maximum AOCP bonus and more importantly, from an undiscounted lifetime military pension income of about $ 780,748.

B. RECOMMENDATIONS

1. For Navy Policy

Aviation Officer Continuation Pay (AOCP) should be retained. The Navy should also monitor the effect of AOCP on Navy pilot retention. When airline pilots' wages change, AOCP may also be changed to achieve desired retention results.

Navy pilots need to be educated on their true gross incomes. This thesis's explanations of average variable housing allowances (VHA), and average federal tax savings received by Navy pilots may be used to develop a true perception of the pay differential between actual Navy and airline pilot income. This will assist Navy retention efforts.

If Navy pilots who desire an airline career could receive increased assurance of airline employment following retirement, more Navy pilots may elect to serve twenty-year careers. The Navy should explore the feasibility of providing refresher pilot training and flying assignments to pilots prior to their retirement to assist them in obtaining airline jobs.

The value of military pension income should be stressed to potential departing officers. They should be educated on the effect of airline deregulation on civilian pilot wages and on airline employment stability.

The current Aviation Commanding Officers' Fact Book should be updated to reflect the airline pilot wages reported in this thesis, instead of maximum pilot wage data available from FAPA.

2. For Future Research

Researchers should explore the effect of airline bankruptcies in the deregulated market on average major airline career income.

Researchers should calculate accurate average airline pension benefits. As airline wages change, future pension benefits may decline.

The pilot wages available to national and corporate airline pilots should be compared to Navy pilot earnings.

APPENDIX A

PAY COMPUTATION TABLES FOR NAVY PILOTS

TABLE 53

TOTAL NAVY MILITARY INCOME WITH DEPENDENTS & RECEIVING ACIP

Gross Yearly Pay

	Lieutenant 8 YOS	Lieutenant 9 YOS
Base Pay	$ 27,860.40	$ 27,860.40
BAQ	5,202.00	5,202.00
VHA	2,392.08	2,392.08
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	2,383.00	2,383.00
YEARLY PAY	$ 43,949.92	$ 43,949.92

	LCDR 10 YOS	LCDR 12 YOS
Base Pay	$ 30,816.00	$ 32,551.20
BAQ	6,238.80	6,238.80
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	3,035.00	3,143.00
YEARLY PAY	$ 48,878.48	$ 50,721.68

	LCDR 14 YOS	LCDR 15 YOS
Base Pay	$ 34,034.40	$ 34,034.40
BAQ	6,238.80	6,238.80
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	3,232.00	3,232.00
YEARLY PAY	$ 52,293.88	$ 52,293.88

	CDR 16 YOS	CDR 18 YOS
Base Pay	$ 38,725.20	$ 40,951.15
BAQ	6,825.60	6,826.43
VHA	2,756.40	2,756.40
BAS	1,312.44	1,312.44
Flight	4,800.00	4,440.00
AOCP	0.00	0.00
Tax Benefit	3,675.00	3,770.92
YEARLY PAY	$ 58,094.64	$ 60,055.36

Source: Navy Pay Manual, Author

TABLE 54

TOTAL NAVY MILITARY INCOME
WITH DEPENDENTS & RECEIVING ACIP AND INSTALLMENT AOCP

Gross Yearly Pay

	Lieutenant 8 YOS	Lieutenant 9 YOS
Base Pay	$ 27,860.40	$ 27,860.40
BAQ	5,202.00	5,202.00
VHA	2,392.08	2,392.08
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	6,000.00	6,000.00
Tax Benefit	2,722.00	2,722.00
YEARLY PAY	$ 49,160.92	$ 49,160.92

	LCDR 10 YOS	LCDR 12 YOS
Base Pay	$ 30,816.00	$ 32,551.20
BAQ	6,238.80	6,238.80
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	6,000.00	6,000.00
Tax Benefit	3,315.00	3,382.00
YEARLY PAY	$ 54,030.48	$ 55,832.68

	LCDR 14 YOS	LCDR 15 YOS
Base Pay	$ 34,034.40	$ 34,034.40
BAQ	6,238.80	6,238.80
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	3,232.00	3,232.00
YEARLY PAY	$ 52,293.88	$ 52,293.84

	CDR 16 YOS	CDR 18 YOS
Base Pay	$ 38,725.20	$ 40,951.15
BAQ	6,825.60	6,826.43
VHA	2,756.40	2,756.40
BAS	1,312.44	1,312.44
Flight	4,800.00	4,440.00
AOCP	0.00	0.00
Tax Benefit	3,675.00	3,770.92
YEARLY PAY	$ 58,094.64	$ 60,055.36

Source: Navy Pay Manual, Author

TABLE 55

TOTAL NAVY MILITARY INCOME
WITH DEPENDENTS & RECEIVING ACIP AND LUMP-SUM AOCP

Gross Yearly Pay

	Lieutenant 8 YOS	Lieutenant 9 YOS
Base Pay	$ 27,860.40	$ 27,860.40
BAQ	5,202.00	5,202.00
VHA	2,392.08	2,392.08
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	36,000.00	0.00
Tax Benefit	3,736.04	2,348.00
YEARLY PAY	$ 80,174.96	$ 42,786.92

	LCDR 10 YOS	LCDR 12 YOS
Base Pay	$ 30,816.00	$ 32,551.20
BAQ	6,238.80	6,238.80
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	0.00	0.00
Tax Benefit	2,960.00	3,099.00
YEARLY PAY	$ 47,675.48	$ 49,549.68

	LCDR 14 YOS	LCDR 15 YOS
Base Pay	$ 34,034.40	$ 34,034.40
BAQ	6,238.80	6,238.60
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	3,232.00	3,232.00
YEARLY PAY	$ 52,293.88	$ 52,293.88

	CDR 16 YOS	CDR 18 YOS
Base Pay	$ 38,725.20	$ 40,951.15
BAQ	6,825.60	6,828.43
VHA	2,756.40	2,756.40
BAS	1,312.44	1,312.44
Flight	4,800.00	4,440.00
AOCP	0.00	0.00
Tax Benefit	3,675.00	3,770.92
YEARLY PAY	$ 58,094.64	$ 60,055.36

Source: Navy Pay Manual, Author

TABLE 56

TOTAL NAVY MILITARY INCOME
WITHOUT DEPENDENTS & RECEIVING ACIP

Gross Yearly Pay

	Lieutenant 8 YOS	Lieutenant 9 YOS
Base Pay	$ 27,860.40	$ 27,860.40
BAQ	4,269.00	4,269.00
VHA	2,392.08	2,392.08
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	2,867.00	2,383.00
YEARLY PAY	$ 43,501.52	$ 43,501.42

	LCDR 10 YOS	LCDR 12 YOS
Base Pay	$ 30,816.00	$ 32,551.20
BAQ	5,274.00	5,274.00
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	3,504.00	3,610.00
YEARLY PAY	$ 48,382.68	$ 50,223.88

	LCDR 14 YOS	LCDR 15 YOS
Base Pay	$ 34,034.40	$ 34,034.40
BAQ	5,274.00	5,274.00
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	3,659.00	3,659.00
YEARLY PAY	$ 51,756.08	$ 51,721.08

	CDR 16 YOS	CDR 18 YOS
Base Pay	$ 38,725.20	$ 40,951.15
BAQ	5,752.80	5,752.80
VHA	2,756.40	2,756.40
BAS	1,312.44	1,312.44
Flight	4,800.00	4,440.00
AOCP	0.00	0.00
Tax Benefit	4,100.57	4,135.79
YEARLY PAY	$ 57,447.41	$ 59,347.43

Source: Navy Pay Manual, Author

TABLE 57

TOTAL NAVY MILITARY INCOME
WITHOUT DEPENDENTS & RECEIVING INSTALLMENT AOCP

Gross Yearly Pay

	Lieutenant 8 YOS	Lieutenant 9 YOS
Base Pay	$ 27,860.40	$ 27,860.40
BAQ	4,269.00	4,269.00
VHA	2,392.08	2,392.08
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	0.00	0.00
Tax Benefit	3,091.00	3,091.00
YEARLY PAY	$ 48,597.52	$ 48,597.52

	LCDR 10 YOS	LCDR 12 YOS
Base Pay	$ 30,816.00	$ 32,551.20
BAQ	5,274.00	5,274.00
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	0.00	0.00
Tax Benefit	3,736.00	3,812.60
YEARLY PAY	$ 53,486.68	$ 55,298.48

	LCDR 14 YOS	LCDR 15 YOS
Base Pay	$ 34,034.40	$ 34,034.40
BAQ	5,274.00	5,274.00
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	3,689.00	3,689.00
YEARLY PAY	$ 51,786.08	$ 51,786.08

	CDR 16 YOS	CDR 18 YOS
Base Pay	$ 38,725.20	$ 40,951.15
BAQ	5,752.80	5,752.80
VHA	2,756.40	2,756.40
BAS	1,312.44	1,312.44
Flight	4,800.00	4,440.00
AOCP	0.00	0.00
Tax Benefit	4,100.57	4,135.79
YEARLY PAY	$ 57,447.41	$ 59,347.43

Source: Navy Pay Manual, Author

TABLE 58

TOTAL NAVY MILITARY INCOME
WITHOUT DEPENDENTS & RECEIVING LUMP-SUM AOCP

Gross Yearly Pay

	Lieutenant 8 YOS	Lieutenant 9 YOS
Base Pay	$ 27,860.40	$ 27,860.40
BAQ	4,269.00	4,269.00
VHA	2,392.08	2,392.08
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	36,000.00	0.00
Tax Benefit	3,222.16	2,840.00
YEARLY PAY	$ 78,728.68	$ 42,345.92

	LCDR 10 YOS	LCDR 12 YOS
Base Pay	$ 30,816.00	$ 32,551.20
BAQ	5,274.00	5,274.00
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	3,672.00	3,672.00
AOCP	0.00	0.00
Tax Benefit	3,452.00	3,552.00
YEARLY PAY	$ 47,202.68	$ 49,037.88

	LCDR 14 YOS	LCDR 15 YOS
Base Pay	$ 34,034.40	$ 34,034.40
BAQ	5,274.00	5,274.00
VHA	2,676.24	2,676.24
BAS	1,312.44	1,312.44
Flight	4,800.00	4,800.00
AOCP	0.00	0.00
Tax Benefit	3,689.00	3,689.00
YEARLY PAY	$ 51,786.08	$ 51,786.08

	CDR 16 YOS	CDR 18 YOS
Base Pay	$ 38,725.20	$ 40,951.15
BAQ	5,752.80	5,752.80
VHA	2,756.40	2,756.40
BAS	1,312.44	1,312.44
Flight	4,800.00	4,440.00
AOCP	0.00	0.00
Tax Benefit	4,100.57	4,135.79
YEARLY PAY	$ 57,447.41	$ 59,347.43

Source: Navy Pay Manual, Author

APPENDIX B

MARKOVIAN ANALYSIS OF PILOT PROMOTION PROBABILITIES

The Markovian chain model can be used to predict pilot promotion rates [Ref. 42]. The model for this study made the following assumptions:

1. The structure of a pilot's career is hierarchical. Positions are clearly defined from high to low.
2. All pilots enter through the lowest position.
3. The airline has a fixed number of pilots.
4. Promotions are from one grade to the next. Grades are not skipped.
5. Promotions are based on seniority. Pilots are promoted as more senior pilots are promoted or retire.
6. All pilots are promoted in turn. The wastage rate (those pilots who leave the airline before retirement) is zero.
7. All pilots will retire at age sixty.
8. The grade sizes are fixed.

If all assumptions hold, this Markov model can accurately predict the promotion rate of a new pilot over a thirty year career. A pilot's career is hierarchical. Pilot positions are clearly defined from high to low. Captains of the largest, fast aircraft earn the highest hourly salary. First and second officers each earn a percentage of the captain's hourly pay. Table 59 lists in descending order the highest paying pilot positions and hourly pay for a major airline with a high pilot pay scale.

Since all pilots begin as B-727 second officers, and are promoted in turn, no pilot can be promoted until a B-747 captain retires at age sixty. This set of conditions creates a "pull demand" model. When the number of airline pilots, pilot age, seniority and position of each pilot is initially known, a pilot's promotion probability to each grade can be computed. Table 60 gives an example of a Markovian analysis for one major airline.

TABLE 59

HIERARCHY OF PILOT POSITIONS AND REPRESENTATIVE PAY

	Gross Pay per Hour
B-747 Captain	$ 169.63
DC-10 Captain	168.78
B-727 Captain	162.64
B-747 First Officer	161.79
DC-10 First Officer	152.91
B-747 Second Officer	142.98
DC-10 Second Officer	131.61
B-727 First Officer	127.31
B-727 Second Officer	122.93

Source: 1985 airline union contract

TABLE 60

MARKOVIAN PREDICTION OF PILOT PROMOTIONS

Year	Crew Position	Aircraft
1	Second Officer	B-727
5	First Officer	B-727
10	Second Officer	DC-10
13	Second Officer	B-747
16	First Officer	DC-10
18	First Officer	B-747
20	Captain	B-727
25	Captain	DC-10
28	Captain	B-747
30	Retired	

Source: Author

However, since airline deregulation, the size of airlines along with the number of employed pilots has widely fluctuated. Contracting airlines demote pilots to lower paying positions. Expanding airlines offer more rapid promotions. For this reason, Markovian analysis was able to predict promotion rates only in the short term while airline

size was somewhat constant. The more rapid the airline changed size, the more inaccurate the model.

APPENDIX C

AIRLINE WAGE REGRESSIONS

TABLE 61

RANGE OF REGRESSION ANALYSIS

Pilot Airline Salaries 1984-1985
SUMMARY OF ACTUAL PILOT WAGES REGRESSION ANALYSIS
FROM ALPA DATA

MAJOR AIRLINES: Annual Revenue $ 1 Billion

AIRLINE	Regression Equation
American	Note 1.
Continental	Note 1.
Delta	Pay = $ 43,908 + 3,308 (YOS)
Eastern	Pay = $ 28,068 + 2,670 (YOS)
Flying Tigers	Pay = $ 50,111 + 2,882 (YOS)
Northwest	Pay = $ 25,585 + 3,807 (YOS)
Pan AM	Pay = $ 34,291 + 2,409 (YOS)
Piedmont	Pay = $ 44,039 + 2,520 (YOS)
Republic	Pay = $ 61,443 + 1,740 (YOS)
TWA	Pay = $ 17,194 + 2,989 (YOS)
United	Pay = $ 9,169 + 3,871 (YOS)
USAir	Pay = $ 42,336 + 3,302 (YOS)
Western	Pay = $ 22,179 + 2,646 (YOS)

AIRLINE	VALID RANGE IN YEARS OF EQUATIONS
American	Note 1.
Continental	Note 1.
Delta	31.0-10.0
Eastern	30.8- 4.5
Flying Tigers	31.6- 6.1
Northwest	31.5- 6.0
Pan AM	31.5- 6.3
Piedmont	30.7- 7.3
Republic	29.8- 4.0
TWA	31.8- 10.0
United	31.3- 10.0
USAir	30.6- 2.5
Western	32.3- 7.0

Note 1: ALPA data not available on these airlines.
Note 2: (YOS) is completed years of service with the airline. A probationary pilot has zero YOS.

APPENDIX D

AVERAGE AIRLINE PILOT HOURS FLOWN

TABLE 62

PILOT HOURS FLOWN
AUGUST- NOVEMBER 1975

	Number of Workers
ALL CAPTAINS	11,258
With Credited Flight Hours of:	
55 and under 60	121
60 and under 65	475
65 and under 70	573
70 and under 75	3274
75 and under 80	5624
80 and under 85	744
85 and under 90	144
ALL First Officers	9,951
With Credited Flight Hours of:	
50 and under 55	57
55 and under 60	55
60 and under 65	513
65 and under 70	572
70 and under 75	3108
75 and under 80	4628
80 and under 85	655
85 and under 90	139
90 and over	44
ALL Second Officers	7,708
With Credited Flight Hours of:	
50 and under 55	52
55 and under 60	88
60 and under 65	722
65 and under 70	498
70 and under 75	2449
75 and under 80	3377
80 and under 85	296
85 and under 90	60
90 and over	12

Source: Industrial Wage Survey: Scheduled Airlines, U.S. Department of Labor 1977
Bureau of Labor Statistics
Bulletin 1951

TABLE 63

PILOT HOURS FLOWN
SEPTEMBER 1980

	Number of Workers
ALL CAPTAINS	13,678
With Credited Flight Hours of:	
50 and under 55	70
55 and under 60	89
60 and under 65	463
65 and under 70	1111
70 and under 75	3738
75 and under 80	5223
80 and under 85	0
85 and under 90	76
ALL First Officers	12,435
With Credited Flight Hours of:	
50 and under 55	104
55 and under 60	118
60 and under 65	424
65 and under 70	653
70 and under 75	3479
75 and under 80	4914
80 and under 85	0
85 and under 90	0
90 and over	0
ALL Second Officers	8,606
With Credited Flight Hours of:	
50 and under 55	115
55 and under 60	0
60 and under 65	0
65 and under 70	442
70 and under 75	2854
75 and under 80	3828
80 and under 85	0
85 and under 90	0
90 and over	0

Source: Industrial Wage Survey: Certified Air Carriers, September 1980, U.S. Department of Labor June 1982
Bureau of Labor Statistics
Bulletin 2129

TABLE 64

AVERAGE PILOT HOURS FLOWN JUNE 1984

June 1984	Number of Workers
ALL CAPTAINS	14,597
With Credited Flight Hours of:	
40 and under 45	52
45 and under 50	68
50 and under 55	180
55 and under 60	218
60 and under 65	424
65 and under 70	428
70 and under 75	1224
75 and under 80	6268
80 and under 85	3129
85 and under 90	0
ALL First Officers	14,025
With Credited Flight Hours of:	
45 and under 50	91
50 and under 55	177
55 and under 60	160
60 and under 65	367
65 and under 70	487
70 and under 75	1264
75 and under 80	5944
80 and under 85	2919
85 and under 90	0
90 and over	0
ALL Second Officers	7,806
With Credited Flight Hours of:	
50 and under 55	102
55 and under 60	192
60 and under 65	165
65 and under 70	303
70 and under 75	914
75 and under 80	4352
80 and under 85	962
85 and under 90	355
90 and over	0

Source: Industrial Wage Survey: Certified Air Carriers, June 1984, U.S. Department of Labor, August 1985 Bureau of Labor Statistics Bulletin 2241

APPENDIX E

SUMMARY OF POST-1983 MAJOR AIRLINE WAGE CHANGES

American's two-tiered pilot structure allows American to hire new pilots at 50 % less than current levels after 1986 [Ref. 67: p. 27].

American Airlines Inc. won the right in late 1983 to hire new pilots at from 30 % to 50 % below old pay rates and to keep pay levels down. A 12th year captain with American will now earn $ 65,000 per year compared to a top rate of $ 150,000 for a senior captain now [Ref. 59: p. 127].

At American Airlines, a DC-10 pilot with top seniority can now make $ 127,900 a year. The lower tier pay scale is designed so that a newly hired pilot will earn only about half as much flying the same plane, no matter how many years he flys. American has hired 372 new pilots on the new pay scale with 3,700 pilots remaining on the old pay scale [Ref. 45 : pp. 82-84].

American won the right to hire new pilots at 50 % of current pilot pay rates in return for the costly promise of lifetime employment for current pilots at the older, high wage rates [Ref. 46: p. 41].

Twenty-five percent of striking Continental pilots have returned to work. Striking pilots are receiving $ 2,400 per month from their union [Ref. 47].

Continental is paying their top pilots $ 45,000 after abrogating pilot contracts [Ref. 44: p. 127].

Eastern pilots agreed to a two-year settlement. Pilots will receive a 17.5 percent pay increase to be taken in the form

of subordinated debentures paying 5 percent interest. Monthly flight time increased from 80 to 85 hours [Ref. 49].

Eastern unions filed suit over Easterns extension of wage concessions of 22 % pay cuts for pilots agreed to in late 1983. Pilots agreed to the 22 % wage cuts in return for 12 million shares of common stock worth 25 % of the airline. Frank Borman, Easterns president, told employees December 31, 1984 that the wage concessions would continue but that the stock plan would be eliminated until, union negotiations are completed. Union leaders called the action a "betrayal." Eastern pilots agreed to a 22 % pay cut in late 1983 in exchange for 12 million shares in common stock worth 25 % of the airline [Ref. 50: p. 32].

Eastern told its unions to accept a 15 % wage cut or face a Chapter 11 bankruptcy similar to Continental on October 13, 1983 [Ref. 51: p. 128].

Delta Air Lines Inc. is moving to match the pilot pay-cuts won by American [Ref. 48: p. 127].

Airline executives argue that the equilibrium for a top pilot pay could be as low as $65,000 in current dollars, 42 % below average pay for ALPA members [Ref 52: p. 127].

Northwest Orient pilots agreed to a pay freeze until January 1, 1984 and increased flying hours from 75 to 83 hours maximum oer month. Pilots will receive a raise of 7.5 percent at the end of the freeze and 6.5 percent in 1985 [Ref. 54].

Pan Am pilots have delayed pay raises of up to eighteen percent during the present contract. These raises are due January 1, 1985. Pan Am pilots have agreed to stretch out over thirty-two months the twenty-six percent increase due them on January 1, 1985. Pilots, however, struck in March,

1985 over Pan Am's offer of a twenty percent pay raise over three years [Ref. 55: p. 35].

Pan American pilots accepted givebacks twice since 1981. Management now wants to reduce its 1984 $850 million dollar labor bill by $250 million [Ref. 56: p. 30].

Pan Am pilots new contract stretches out pay hikes due last Jan 1 and guarantees productivity increases to offset the added costs of the contract [Ref. 57: p. 39].

Piedmont has a two-tiered pay system. Second-tier officers are paid 28% less the first-tier officers until the third year the pilot is a captain. Piedmont pilots are making captain in four years so this amounts to a seven-year pay reduction [Ref. 64: p. 79].

Piedmont Airlines agreed to a two-tiered wage system for new pilots. New pilots will receive less than the pilots presently on the payroll. Effective retroactive to April 1, 1984. Locals of the Air Line Pilots Association (ALPA) have accepted wage deferrals or reductions 45 times since 1980 [Ref. 53: p. 127].

Republic Airlines pilots agreed to an extension of a 15 percent pay cut instituted in November, 1983. The cut will be extended through 1986 [Ref. 60].

Republic pilots second-officers are paid 10% below current rates for the first three years, with parity after four years [Ref. 58: p. 79].

Republic Airlines reduced pilot pay 15 % effective September 1, 1983 [Ref. 43 : p. 29].

United negotiators agreed on a new two-tiered pay system. Starting salaries for new pilot hires will be between 34 to 50 % of the current pay scale for a five-year period.

Permanent new-hire rates will be set within the next five years based on a review of the records of the three largest competitors. United sets wages for second officers after the first year at 19% below normal rates for B-747 second officers, 7-9% lower for DC-10 second officers and 3% lower for DC-8 and B-767 second officers. The contract allows for parity [Ref. 61: p. 79].

United 5,000 striking pilots ended a strike over a two-tiered pay system. The new pay system will pay new pilots at rates between 34 % and 50 % of the current scale for a five-year period. After five years, a permanent pay scale will be devised after examining the records of the top five competitors [Ref. 63: p. 79].

Western pilots agreeded to a 18% pay cut in November, 1983. The new contract makes the 18% cut permanent and includes another 12.5% cut. It includes a 30% increase in productivity and a 3% reduction in retirement benefits [Ref. 65: p. 39].

Western pilots agreed to a 10 % pay cut until Sept. 30, 1984 and defer an 8 % pay raise [Ref. 66 : p. 32].

This Western pay reduction included a stock ownership plan representing 32 % of the company's total stock [Ref. 62 : p. 29].

An independent arbitrator issued a decision in July, 1984, extending the pay cuts of Western's 1,200 pilots in addition to a further 12.5 % wage cut and a 26 % productivity improvement [Ref. 68 : p. 30].

A Federal court upheld a ruling that Western violated the Age Discrimination Act by imposing a mandatory retirement age of 60 on flight engineers and by refusing to allow DC-10 pilots nearing the Federal Aviation Administrations required

retirement age of 60 for pilots to "bid down" on flight engineers jobs. There are 200 flight engineers over age 60 still flying [Ref. 69].

APPENDIX F

AGES OF EX-MILITARY NEW HIRE AIRLINE PILOTS

TABLE 65

AGES OF EX-MILITARY NEW HIRE CIVILIAN AIRLINE PILOTS 1984

Jan-Feb	Apr	June	July	Aug	Oct
29.5	28.4	28.1	28.1	27.1	28.5
30.0	29.1	29.1	28.5	28.0	28.8
30.1	29.6	29.5	28.7	28.8	29.0
32.9	30.1	29.7	29.1	28.9	29.0
32.9	31.1	30.4	29.1	29.5	29.1
33.2	31.5	32.4	30.1	29.5	29.3
34.2	31.5	33.0	30.4	29.6	29.7
39.7	34.3	33.1	30.5	30.6	30.2
		34.0	31.1	31.1	30.6
		34.1	31.6	32.0	31.9
		34.8	33.4	32.2	32.1
		36.9	33.8	36.3	32.1
		41.6	34.1	47.1	32.2
			35.0	55.4	34.4
			35.0		34.9
			36.3		43.9
			36.8		
			37.3		
			44.0		

Average Age[1]	31.345 years
Standard Deviation	2.576 years
Maximum Age	37.3
Minimum Age	27.1

Source: Piloting Careers
Note 1. Pilots over age 38 omited from average age calculations.

TABLE 66

AGES OF EX-MILITARY NEW HIRE CIVILIAN AIRLINE PILOTS 1985

Jan	Feb	May	June	July	Aug
29	28	28.1	28.7	28.6	27.9
29	28	29.7	29.6	29.9	28.1
30	28.6	29.9	29.7	30.4	28.5
30	28.6	30.2	29.9	31.4	29.2
30	28.7	30.3	30.2	32.4	29.1
30	29	30.8	30.6	34.0	29.9
30	29.0	32.0	31.4	36.4	30.0
31	30.0	32.2	31.4	38.5	30.1
31	30.0	32.2	31.7	38.6	30.5
31	30.0	33.5	31.9		31.6
32	31	33.7	32.8		32.2
32	32.0	38.1	32.8		33.0
33.6	32.4	38.5	33.1		33.2
34	32.5	40.5	33.4		37.1
34	32.7	41.3	34.2		37.5
34.1	32.9		35.9		37.8
37	33		36.0		38.8
37	33.5		37.1		40
44.2	34.0		37.2		
	36.4				
	40.7				
	45.0				

Average Age	31.696 years
Standard Deviation	2.579 years
Maximum Age	37.8
Minimum Age	27.9

Source: Piloting Careers

Note 1. Pilots over age 38 omited from average age calculations.

APPENDIX G

AIRCRAFT OPERATING COSTS 1985

TABLE 67

FLYING COSTS FOR
B-747 1985

All Major Airlines

Crew costs		$ 728.63
Fuel & Oil		2,766.47
Insurance		14.55
Taxes		82.52
Other		0.16
	Sub-total	$ 3,592.33
Maintenance		
Airframes		$ 153.93
Engines		188.20
Other		40.56
	Sub-total	$ 382.69
Depreciation		$ 395.53
Amortization		152.57
Rentals		84.04
	TOTAL	$ 4,708.68

Source: 1985 World Aviation Directory
Note: Costs are average per block hour flown by all major U.S. airlines.

TABLE 68

FLYING COSTS FOR
B-727 1985

All Major Airlines

Crew costs		$ 455.80
Fuel & Oil		998.11
Insurance		6.56
Taxes		25.46
Other		0.04
	Sub-total	$ 1,488.97
Maintenance		
Airframes		$ 63.32
Engines		44.02
Other		11.53
	Sub-total	$ 118.87
Depreciation		$ 151.42
Amortization		35.77
Rentals		21.54
	TOTAL	$ 1,846.23

Source: 1985 World Aviation Directory
Note: Costs are average per block hour flown by all major U.S. airlines.

APPENDIX H

AIRLINE RETIREMENT PENSIONS

TABLE 69

MAJOR AIRLINE PENSION PLANS

PENSION PLANS 1984-1985

MAJORS AIRLINES	
AMERICAN	60%
CONTINENTAL	NONE
DELTA	60%
EASTERN	60%
FEDERAL EXPRESS	NOTE 1
FLYING TIGERS	NOTE 1
NORTHWEST	NOTE 1
PAN AM	NOTE 1
PIEDMONT	YES
REPUBLIC	NOTE 1
TWA	NOTE 1
UNITED	NOTE 1
USAIR	NOTE 1
WESTERN	NOTE 1

Source: FAPA 1985 PILOT SALARY SURVEY
NOTE 1: RETIREMENT PAY IS A VARIABLE AND A FUNCTION OF AVERAGED LAST YEARS OF SERVICE -- 30 % TO 60 %.

TABLE 70

AIRLINE PENSION PLANS

TABLE 28

Pension Plans 1984-1985

National Airlines

National Airlines

	1984	1985
Airborne	Yes	Yes
Air Cal	Yes	Yes
Air Florida	Not Av	Bankrupt
Alaska	Yes	Yes
Aloha	32 %	Yes
American West	None	None
Capitol	Yes	??
Empire		None
Frontier	Yes	Yes
Hawaiian	Yes	Yes
Midway	None	None
Midway Express	None	Not Avail.
New York Air	24%	24%
Ozark	Yes	Yes
Peoples Express	None	None
PSA	Yes	Yes
Southwest	Yes	Yes
Trans Am	Yes	Yes
Wien	Yes	Yes
World	Yes	Yes

Source: FAPA 1985 Pilot Salary Survey
Note 1: Retirement pay is a variable and a function of averaged last years of service -- 30 % to 60 %.

APPENDIX I

AVERAGE PILOT SENIORITY 1983 BY EQUIPMENT AND POSITION

Major AIrlines ALPA ACTIVE MEMBERSHIP

Equipment	Average Age		Pilots	Seniority
B-707	Cap	57.54	13	28.8
	F/O	47.50	8	18.1
	S/O	46.59	14	19.3
B-727	Cap	48.52	3,265	21.9
	F/O	42.51	3,082	14.8
	S/O	37.96	2,766	9.7
B-737	Cap	46.81	465	19.7
	F/O	42.41	485	14.6
	S/O	34.18	17	6.0
B-747	Cap	54.79	632	28.9
	F/O	47.77	685	19.7
	S/O	57.01	354	30.3
B-757	Cap	51.00	81	25.4
	F/O	42.96	73	16.5
	S/O	44.00	3	15.7
B-767	Cap	51.77	35	26.2
	F/O	44.64	252	17.3
	S/O	48.00	1	16.0
CV-580	Cap	32.70	70	5.8
	F/O	31.83	6	4.7
DC-8	Cap	52.11	265	26.3
	F/O	44.96	301	16.7

	S/O	39.90	225	11.8
DC-9	Cap	47.28	1,781	20.4
	F/O	36.9	1,650	9.2
	S/O	30.50	2	1.5
DC-10	Cap	55.06	500	29.3
	F/O	46.02	442	18.0
	S/O	47.02	363	17.8
BAC-111	Cap	45.58	139	18.3
	F/O	33.63	104	4.1
L-1011	Cap	54.35	715	28.7
	F/O	44.65	594	17.6
	S/O	42.09	574	14.6
A-300	Cap	54.83	195	28.7
	F/O	44.97	166	17.7
	S/O	39.67	1539	11.9
M-298	Cap	45.23	103	19.3
	F/O	33.02	92	4.2
AVERAGES				
	Cap	49.03	10,895	22.4
	F/O	41.5	10,240	13.4
	S/O	40.72	5,576	12.4

Source: ALPA 1983 Wage Survey

APPENDIX J

UNITED STATES INCOME LEVELS

TABLE 71

MONEY INCOME OF HOUSEHOLDS 1985

Percent Distribution by Income Level

Gross Income	Percent
$ 50,000 and over	8.9
35,000-49,999	13.2
25,000-24,999	16.9

Median income $ 20,171

Source: Department of Labor

TABLE 72

CENSUS FIGURES FOR INCOME

Wages as of March 1983

Earnings > $ 64,000 in top five percent of U.S.

Earnings > $ 39,492 in top twenty percent of U.S.

Source "Earnings by Occupation and Education"
U.S. Dept. of Commerce, Burea of the Census,
Vol. 2, May 1984 pp. 3 - 485.

TABLE 73

CENSUS FIGURES FOR INCOME

Household Income March 1981

$ 35,000 to 49,999	10.3 percent of U.S. households
$ 50,000 to 74,999	4.1 percent of U.S. households
$ 75,000 up	1.3 percent of U.S households

Expected life-time earnings for a male college graduate age 35 in 1981 dollars $ 956,000

Source: "Earnings by Occupation and Education" U.S. Dept. of Commerce, Burea of the Census, Vol. 2, May 1984 pp. 3 - 485.

APPENDIX K

AIRLINE POINTS OF CONTACT

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